CODE OF PRACTICE FOR WORKS AFFECTING BRITISH WATERWAYS

OCTOBER 2005

Vision

"Our ambition is that by 2012 we will have created an expanded, vibrant, largely self sufficient waterway network used by twice as many people as in 2002. It will be regarded as one of the nation's most important and valued national assets. Visitors will be delighted with the quality of the experience and as a consequence many will become active participants."

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DEFINITIONS

Promoter	The "Promoter" referred to in this Code of Practice shall be the body or company or individual (or legal successors) procuring the work or activity. A Consulting Engineer or other advisor is viewed by British Waterways as an agent of the Promoter. In the case of agency arrangements such as in the water industry, the agent authority will be regarded as a Promoter
Contractor	The party or parties employed by the Promoter to carry out the Works, who will act as his agent for execution of the Works (including the Principal Contractor and Contractors as defined in the CDM Regulations).
British Waterways	Refers to the British Waterways Board and subsidiary companies.
Waterway	The "Waterway" means any canal, inland or river navigation, feeder, reservoir or dock belonging to or under the control of British Waterways and includes any works, services, lands or premises belonging to or under the control of British Waterways and held or used by them in connection with its business.
The Bye-Laws	The Bye-Laws means the "General Canal Bye-Laws 1965, subsequent amendments and any other canal/waterway by-laws currently in force".
British Waterways Property	The land (including land covered with water), Waterway, property, sub-soil and air space owned and/or managed from time to time by British Waterways.
The Works	The "Works" mean all temporary and permanent works proposed and their associated maintenance where they affect the Waterway or British Waterway property.
Notification Form	A summary of the proposal provided at an early stage of discussions on a standard form. This serves to register the scheme and provide essential preliminary information.
Application	Either a standard form agreed with the Promoter or a letter accompanying with the Submission
Submission	A package of drawings, site investigations, method and safety statements etc which define the Works and the means of carrying them out.
Contract	The "Contract" means the Commercial Contract between British Waterways and the Promoter, which authorises the Works to be placed on the property of British Waterways.
The Works Contract	The "Works Contract" means any contract in force from time to time between the Promoter and his Contractor appointed to carry out the Works on his behalf.
The Engineer	Refers to the British Waterways engineer responsible for the project

Estates Manager	Refers to the British Waterways estates officer responsible for the project
Specific Requirements	The Specific Requirements are technical details or requirements issued by the Engineer so that Promoters can develop acceptable proposals for their specific needs.
Special Requirements	Model contract clauses for Works Contracts as provided in the appendices to this Code or otherwise agreed.

1. INTRODUCTION

1.1. British Waterways

British Waterways cares for a 2,000 mile network of historic canals and navigable rivers across the country. Its aim is for a sustainable and integrated network of waterways throughout Britain providing maximum benefit and enjoyment to society, both now and long into the future. British Waterways is a not-for-dividend organisation and works with a broad range of public, private and voluntary sector partners to unlock the potential of the inland waterways and generate income for reinvestment for the benefit of the millions who visit and care for the waterways.

British Waterways is a public corporation responsible to the Department of Environment Food and Rural Affairs in England and Wales and to the Enterprise and Lifelong Learning Department in the Scottish Executive in Scotland.

The network is well over 200 years old, has considerable heritage and ecological value and needs to be treated with particular care and consideration.

The aims of British Waterways as explained in the *Framework Document for British Waterway*s (DETR, 1999). can be summarised as:

- maintain and develop Britain's inland waterways in a sustainable manner, so that they fulfil their full economic, social and environmental potential
- fulfil statutory navigation functions
- conserve waterways heritage and environment for the future
- promote and enable rural and urban regeneration
- maintain and enhance leisure, recreation, tourism and educational opportunities for the general public
- facilitate waterway transport
- play a lead role in co-ordinating other UK navigation authorities

1.2. Statutory Framework

Rivers were made navigable before the Industrial Revolution under the authority of 'Letters Patent'. The canals were built from the late 18th Century under the authority of 'Enabling Acts', which gave compulsory purchase powers and defined the rights and responsibilities of the canal companies. The waterway system was brought into public ownership in 1947 as part of the national transport system.

Further powers and duties were given in a number of British Transport Commission Acts, including the 1954 BTC Act, which authorised the General Canal Bye-Laws. The 1962 and 1968 Transport Acts set up British Waterways in its present form and recognised the leisure potential of the system. British Waterways' heritage and environmental duties were confirmed in the British Waterways Act 1995.

1.3. Purpose of this Code

This Code of Practice gives guidance and procedures to Developers, Local Authorities, Statutory Undertakers and their consultants when carrying out Works for their purposes, which affect Waterways. This Code safeguards the interests of British Waterways in protecting the Waterway.

1.4. The *Code of Practice for Works affecting British Waterways*

The Code developed from a British Transport Commission Document. Prior to 1995 it was known as the *Requirements and Conditions for Works affecting British Waterways* and earlier still as *Procedure 4*. It is accepted as the industry standard for works affecting navigable waterways.

The Code is subject to periodic review and Promoters should satisfy themselves that their copy of the Code is the most up to date issue. It is an uncontrolled document.

The key revisions are listed in Appendix 6:

1.5. Structure of British Waterways

British Waterways has a head office responsible for policy matters. The Waterways are managed by General Managers. Professional support to the General Managers is provided by engineering, estates, heritage and environmental teams including the 'Engineer' and the 'Estates Manager'.

1.6. Customers of British Waterways

British Waterways has many customers such as boaters, anglers, walkers, industrialists, businesses, developers, utilities and private citizens. British Waterways has obligations to all these customers and these duties need to be taken into consideration when planning any new proposals.

1.7. The Waterway Environment

The Waterway Environment is of great importance containing many Scheduled Ancient Monuments, Listed Buildings and Conservation Areas. There is also a great variety of wildlife habitats including Nature Reserves, Sites of Special Scientific Interest, Sites of Local Interest for Nature Conservation important and valued hedgerows, trees and woodlands and valuable fisheries. Our waters are reasonably clean, and wildlife, people, and industry all depend on them remaining unpolluted. British Waterways has statutory duties to safeguard the environment.

1.8. **Need for a Contract**

It will usually be necessary for the Promoter to enter into a Contract to licence the Works on British Waterways' property. In order to safeguard the Waterway, the Contract will normally be based on the following principles:

- protection of the Waterway from the effects of the Promoters' temporary and permanent works.
- no perpetual term will be granted
- the Works shall be kept in good repair by the Promoter
- no imposition of irrecoverable costs.
- the prevention and making good of any damage.
- no contingent liabilities.
- a payment reflecting the value to the Promoter of the Contract offered

Further information can be found in Appendix 3

1.9. **Works adjacent to the Waterway**

In the case of Works adjacent to British Waterways Property, the principles are that no support is offered and no loads are to be imposed on the property. The Party Wall Act is usually applicable and application should be made in accordance with that Act. When a Contract is not needed the technical provisions of this Code will apply.

2. PROCEDURE

2.1. **Early Discussions**

The importance of having discussions with British Waterways at the earliest opportunity cannot be over-emphasised. It is always beneficial to have an early meeting with British Waterways. Guidance on the requirements of British Waterways and the use of this Code will be given.

2.2. **Costs Undertaking and Application Fee**

If the Promoter has no existing contract with British Waterways and before British Waterways is involved in spending significant time on a project, the Promoter will be, required to enter into a Costs Undertaking (Appendix 4), giving a contractual means of recovering costs.

A sum of £250 is required with this undertaking. This represents an contribution towards the administrative costs of British Waterways in making an initial assessment of the Application. The payment of that sum to British Waterways does not imply that British Waterways will ultimately accept the Promoter's Works. That sum will not be returnable irrespective of whether or not the Application proceeds

Parties with Omnibus Agreements or other existing contractual arrangements, will be governed by the terms of those agreements, which commonly require an application fee. If the matter of cost recovery is addressed under the agreement, no Costs Undertaking or application fee is needed.

Statutory Undertakers holding Omnibus Agreements with British Waterways will also need to complete the Application form prescribed in the Agreement.

2.3. Notification Form

A Notification Form (Appendix 1) must be completed as soon as possible. This provides the information for British Waterways to carry out preliminary technical, environmental and commercial appraisals. The Engineer will assist in the completion of the form at an initial meeting.

Statutory Undertakers holding Omnibus Agreements with British Waterways will also need to complete the Application form prescribed in the Agreement.

2.4. Communication

Discussions usually take place directly between the Promoter's engineer or his Consulting Engineer and the Engineer and separately but simultaneously between the Promoter or his agent and the Estates Manager. The General Manager is sometimes present at meetings but normally acts through the Engineering and Estates Managers. If several consultants or contractors are tendering for work communication should be through the Promoter until the contract is awarded. This minimises British Waterways' workload and ensures a fair and consistent approach.

2.5. Preliminary Appraisal

The notification form together with supplementary information will enable the Engineer to carry out a preliminary technical and environmental appraisal. The technical appraisal will consider aspects such as:

- navigation
- the integrity of the canal
- flooding risk
- maintenance of feed flows
- safety
- design
- programme
- construction

The environmental appraisal, which will be in accordance with British Waterways' *Environmental Code of Practice,* will consider site specific issues such as:

- protection of landscape and heritage
- maintaining access
- contamination of ground, water or sediment
- presence of protected species such as bats or water voles
- protection of valuable habitats and features

and construction impacts such as:

- noise
- access to site
- pollution control
- waste management

The Promoter may be asked to undertake surveys or investigations / assessments to consider technical and environmental impacts identified in the preliminary appraisals. British Waterways has in house expertise, available through the Engineer, in all aspects of waterway management.

The preliminary appraisals and any supplementary studies will be used by the Promoter at feasibility, design and construction stages to ensure the waterway environment is protected and that all opportunities are taken to enhance it.

2.6. Viability of Proposals

Early discussions may reveal that the proposed Works cannot proceed for technical, environmental or commercial reasons.

2.7. Detailed Discussions and the Submission

Discussions will then proceed. This Code suggests engineering and environmental issues, which may need to be considered. The discussions will include the Promoter's responses to the issues raised by the initial appraisals and actions that will be taken to:

- avoid impacts where possible;
- mitigate damage or replace elsewhere when impacts cannot be avoided
- enhance the waterway environment overall at the end of the works.

The discussions will take the form of meetings, submission of draft drawings, site visits, etc., The form of the Submission will be agreed. Once everything is agreed the 'Submission' is prepared and sent to the Engineer. Earlier documentation will be superseded by the Submission.

2.8. Acceptance of Works

The Engineer will write to the Promoter, or his agent, stating that the proposed Works are generally acceptable to British Waterways.

If execution of the Works is then delayed for more than 12 months, the Acceptance will lapse and need to be reviewed, in the light of changes to the waterway, changes in techniques and changes in policy.

2.9. **The Contract**

The Works may not be executed until the Contract has been completed or that the Promoter has been advised that none is required. The Contract will have been prepared by negotiation between the Promoter's agent and the Estates Manager. It is important that engineering and commercial discussions proceed in parallel, otherwise a delay in the commencement of the Works will result.

In some cases there may be relevant existing contract such as an Omnibus Agreement with a Statutory Undertaker or an Agreement for existing works. In cases where such a contract exists, the Works can proceed on acceptance by the Engineer of the Promoter's Design & Construction Stage Submissions.

2.10. **Pre-works Meeting**

Once a 'Contractor' has been appointed, a pre-works meeting usually takes place, normally on site, to discuss the execution of the Works and the means of safeguarding the canal, its visitors and the waterway environment. The Contractor's proposed working method will be discussed with a view to refining the Promoter's initial Method Statement and making a Construction Stage Submission.

2.11. **Execution of Works**

British Waterways will inspect the Works during execution to ensure that the interests of the Waterway are being safeguarded.

2.12. **As Built Drawings**

After the Works are completed, the 'As Built Drawings' etc. will be supplied to the Engineer, together with a full copy of the safety file.

3. THE SUBMISSION

At the appropriate times, the Promoter will be required, unless otherwise agreed, to submit in **triplicate** (unless advised otherwise) the following for inclusion in the Contract:

3.1. **FEASIBILITY STAGE**

On major schemes, the Promoter will be required to provide technical and environmental appraisals considering all the available options, measures to avoid impacts, mitigate damage and enhance the overall waterway environment.

3.2. **DESIGN**

as appropriate:

3.2.1. **Site Plan**

A location plan to a suitable scale, such as 1:1250.

3.2.2. **Drawings**

Drawings, including a general arrangement, to suitable scales sufficient to illustrate the effect of the Works on the Waterway.

3.2.3. **Design Certificate**

A certificate from a suitably qualified engineer confirming that the Works are fit for purpose, designed in accordance with relevant codes and standards and do not impact adversely on the interests of British Waterways. This certificate may need to be supplemented later for Contractor designed elements.

3.2.4. **Site Investigation**

Site investigation information as appropriate.

3.2.5. **Pre Tender Heath & Safety Plan**

Relevant and concise extracts from the Pre Tender Heath & Safety Plan indicating how the Promoter envisages that the Works will be carried out. Where appropriate Risk Assessments and details of temporary works, which have been specified at this stage, should be included. The Promoter should take into account the age and condition of the Waterways and their usage by leisure and commercial craft, pedestrians, cyclists and anglers. Hazards associated with working near water such as drowning or chemical and biological hazards should also be addressed. The Planning Supervisor should be named.

3.2.6. **Programme**

The Promoter's anticipated overall programme with specific reference to matters of interest to British Waterways such as stoppages and installation of bridge decks.

3.2.7. **Works Contract Documentation**

The Promoter shall include within his Submission copies of contract clauses provided within the Works Contract for the protection of British Waterways. The standard 'Special Requirements in relation to the British Waterways Board' (Appendix 5) should provide the basis for these clauses, additional site specific clauses being added as necessary. There should be a plan depicting the extent of the Contractor's site.

3.2.8. **Tenderer Notification**

Before issuing tenders for the Works, British Waterways will be notified of the names of the contractors it is intended to invite to submit tenders and due consideration will be given to any observations British Waterways may make regarding their suitability for employment to carry out Works affecting British Waterways' property or other interests. British Waterways reserves the right to veto unsuitable Tenderers

3.3. **CONSTRUCTION STAGE**

A second phase of the Submission is to be provided by the Promoter when a Contractor has been appointed but before Works commence on site. The Promoter remains responsible to British Waterways for the actions of the Contractor.

3.3.1. **Site Contacts**

The Promoter shall submit to British Waterways in writing the names, telephone and fax number and Email addresses of the point(s) of contact on site together with their powers and duties under the Works Contract.

3.3.2. **Emergency Contact**

The Promoter shall submit to British Waterways in writing the name and address and telephone number of the Promoter's Engineer or other such competent Persons responsible for the supervision of the Works including twenty-four hour telephone number for emergency contact.

The Promoter shall submit to British Waterways in writing, where applicable, the name, address and telephone number of the Contractor and Sub-Contractors, the site telephone number of his Agent including twenty-four hour number for emergency contact.

3.3.3. **Supervision**

The Promoter shall submit details of the Promoter's arrangements for providing supervision of the Contractor

3.3.4. **Contractor's Temporary Works**

The Promoter shall submit details of all applicable temporary works including piling and other supporting structures may be required. These shall include a certificate of adequacy provided by a competent person.

Where for the purpose of completing the Works in accordance with the Works Contract any Temporary Works are required above the Waterway the Contractor shall, except where otherwise specified in the Works Contract, provide and maintain a minimum headroom clearance level as specified by the Engineer.

3.3.5. **Contractor's Method Statement**

The Promoter shall submit a concise Method Statement, with Risk Assessments, prepared by the Contractor indicating how the works will be carried out, without prejudicing the interests of British Waterways. Detailed Method Statements for individual tasks will be submitted as the Works progress. The Contractor should take into account the age and condition of the Waterways and their usage by leisure and commercial craft, pedestrians, cyclists and anglers and also matters such as historical features, trees, hedgerows, vegetation, habitats and water quality. Hazards associated with working near water such as drowning or waterborne disease should also be addressed. The Planning Supervisor and Safety Officers should be named.

3.3.6. **Contractor's Programme**

The Promoter shall submit a programme in bar chart form showing clearly the anticipated duration of the major stages of the work relating to the Waterway. Individual detailed programmes for critical items may be needed.

3.3.7. **RIDDOR**

British Waterways should be advised of any Reportable Injuries, Diseases or Dangerous Occurrences and supplied with copies of forms F2508 or F2508A.

3.3.8. **Enforcement Action**

British Waterways should be advised of any enforcement action taken by the Health & Safety Executive, Environment Agency (Scottish Environment Protection Agency in Scotland) or any other regulator.

3.4. POST CONSTRUCTION STAGE

3.4.1. As Built Drawings

Within six weeks of completion of the Works, two copies of the 'as-built' drawings, for those aspects of the Works of interest to British Waterways, are to be provided for the Engineer and the Estates Manager. These drawings are to be based on the Submission Drawings amended to show changes made during construction.

3.4.2. Maintenance

Within six weeks of completion of the Works the Promoter shall provide a maintenance and management plan and a landscape re-instatement /maintenance plan, including relevant extracts from the Health & Safety File. The eventual decommissioning / removal of the Works must be addressed.

4. GENERAL INFORMATION & REQUIREMENTS

For the protection of British Waterways in connection with the Works, the Promoter shall be required to accept and meet the following requirements and conditions, in addition to any other requirements set out by other relevant legislation. The Promoter must ensure that his agents and contractors abide by them by inserting suitable clauses where relevant into his Works Contract.

4.1. Programme

Where the Works affect navigation or the amenity of the canal, they should preferably take place between November and March, when the leisure use of the canal is least intensive.

4.2. Stoppages (Closures of the Navigation)

Generally no stoppages of the canal or navigation or towpath will be allowable, except for technical reasons. The Promoter must adopt designs and construction methods, which do not affect navigation. Overnight closures, width restrictions, working between boats, temporary troughs etc. must be considered in order to avoid stoppages albeit at extra cost. On certain Commercial Waterways stoppages of more than a few hours duration may not be permissible in any circumstances.

If the Engineer agrees that a stoppage is unavoidable, such closure should generally take place only between November and March and will be subject to consultation with all British Waterways User Groups at national and local levels. The dates of the closures will be at the discretion of the Engineer, who will take into account traffic patterns, other nearby stoppages, alternative routes etc. Certain key national through routes are maintained free of closures for periods in the winter whilst works take place on alternative routes.

All stoppages must be of minimised duration. Where feasible the canal should be re-opened to traffic at weekends. On longer indivisible jobs, weekend and, where appropriate overnight, working is required in order to minimise the length of the stoppage. There should generally be no stoppages exceeding six weeks in duration but when the Engineer accepts that longer unbroken stoppages are necessary, transfer of boats around the works by road may be required at the Promoter's expense.

All such proposed stoppages must be agreed and paid for (see below), whether or not these closures are used, before the end of the April prior to the closure. For minor projects requiring restrictions and short delays to traffic, where this timescale may not be feasible, six weeks notice is required in order that notices may be published and distributed.

4.3. Towing Paths

The towing path must remain open wherever possible. If diversion is unavoidable, the Promoter must submit his proposals for the acceptance of the Engineer and, where a Public Right of Way is involved, to the local Highway Authority. Diversions should be localised, for instance around the rear of the Works and fit for purpose. Such diversions may be used by the British Waterways maintenance plant and be of a standard to allow continued use by existing visitors – walkers, anglers, people with disabilities, cyclists etc.

The towing path should not be used for access to the Works because of conflict with visitors and the unsuitability of the towing path for vehicular use. In the event that plant is permitted to use the towing path, this will be after an assessment of the suitability of the access with full regard to the stability and integrity of the towing path and consideration of the risks to towing path users.

4.4. Water Level and Cross Sections

The water level is normally controlled by weirs and fluctuations in level can occur for a number of reasons, particularly during storms at the site and upstream, and during dewatering downstream. Care should be taken to define normal water level and maximum water level at the survey stage in consultation with the Engineer. Cross-sections of the Waterway may be required and these shall be submitted before and after the Works at the Promoter's expense. The Contractor should particularly note when planning any work in relation to the Waterway that British Waterways cannot guarantee any particular water level or depth and not prevent any fluctuations to such water level depth or speed of flow in any Waterway.

4.5. Water Control

The Promoter will be required to maintain navigation feed flows and flows being transferred to abstractions past the site and to also deal with storm flows reaching the site at all times including outside normal working hours.

4.6. Fishery

Where stoppages and dewatering occur, the Promoter will be responsible for the fish rescue and re-stocking. In England and Wales, fish rescues must be licensed by the Environment Agency. The Promoter must demonstrate to British Waterways that the Agency has approved fish rescue.

Any valuable or protected species, such as white-clawed crayfish, must be reintroduced to an adjacent suitable habitat.

The Promoter will ensure that where any protected species need to be handled or moved, all necessary authorisations are obtained from the relevant wildlife and environmental regulators, and copies provided to the Engineer.

Any non-native crayfish or zander (a non-native fish found in some Midlands Canals) found during fish rescues should be humanely destroyed as introduction into the wild is illegal.

4.7. Design and Build

The use of Design and Build contractors on small projects needs careful consideration. Unless parameters critical to British Waterways are defined before a contractor is appointed, an unsatisfactory result and/or escalating costs to the Promoter may result. For structures, the concept should be considered as 'Detail and Build' not 'Design as you Build'. For trenchless crossings, the early input of a specialist is essential. The Promoter must advise on the extent of the responsibilities that have been delegated but remains responsible for the proposals.

4.8. Insurance

The Promoter will be liable for any damage arising from the activities of his Agents, such as Consulting Engineers, Contractors and Sub-Contractors. In the event of a claim the first course of action by British Waterways would be directed towards the Promoter, though others may be joined in. It is in the Promoter's interest to ensure that his agents have adequate insurance to protect him from action. However, it is the Promoter's responsibility to ensure the appropriate level of cover is taken. If a Promoter, or his contractor, causes damage to our property then we will seek reinstatement of such damage, plus any inconvenience costs, loss of profits etc., which British Waterways might incur, in full and without monetary limit.

Levels of insurance will be specific to the risks attached to the proposal. The design and construction of the Works should minimise risk to a reasonable level such that insurance for £5,000,000 should suffice. If the potential consequences demand, insurance up to £25,000,000 may be necessary.

4.9. Right of Support

British Waterways enjoys a right of support under Common Law. It is important that support is not removed by excavation, dewatering undermining etc. In area of mining subsidence canals can be of great depth due to bank raising - 10m is not unknown. Factors of safety are often not great and ill-considered actions can be disastrous.

A less obvious consequence of excavating near to canals is that of increasing hydraulic gradients. Not all canals are lined. Seepage rates are increased. Permanent leakage or piping failure can result.

4.10. Support to New Works

British Waterways offers no support to new works. Loads should not be placed near to cuttings, tunnels etc. without being independently supported. Should a British Waterways structure withdraw support from latter development, British Waterways would accept no liability. When building over tunnels. for example, not only should the new structure span independently the old but the effect of a collapse of the tunnel should be considered.

4.11. Cofferdams

The usual options are, stop planks, piling, clay stanks and fabric dams. Stop planks are rarely located at convenient points, resulting in extensive dewatering leading to safety and environmental concern. Piling is generally deprecated unless it can be cut off at bed level because of the damage to the lining caused by withdrawal. Clay dams can displace fluid silts over considerable distances, leading to access difficulty for removal by conventional plant and can cause water quality problems with dispersed silt on removal. Fabric dams are readily portable, can be supplied with flumes for water transfer, but are subject to undercutting, vandalism and boat impact. Inflatable dams may not be used. If large quantities of water could escape from the canal, it is usual to use a secondary bund.

Fabric dams and stop planks must be protected from boat impact.

4.12. Canal Linings

Although not all existing canals have an artificial watertight lining, works must be designed so that the canal is watertight.

Puddle clay is the most common lining material used in existing canals. It was rarely used with a thickness less than 750 mm. Modern compaction plant needs clay of a somewhat lower moisture content, which is therefore less impermeable and a minimum thickness of 1000 mm is now normal. There is evidence that canals in sandy areas were lined in the 18th Century with manure to accelerate the rate at which the surface is sealed.

Modern lining materials include reinforced concrete, butyl and geotextile/bentonite membranes. Bentonite must not be used in areas with high sulphate levels, or with lime stabilised materials. Membranes must be protected from boat propellers boat-shafts and dredgers.

The old and new linings must be tied in using a suitable detail.

Puddle clay must be compliant as a material with the *British Waterways Specification for Puddle Clay,* be from a source approved by British Waterways and be placed in accordance with the *British Waterways Specification for Puddle Clay* in accordance with an agreed Method Statement. Compaction of puddle clay into pile pans must receive special attention. Lime stabilised clays must not be used.

Interlocking sheet steel piles cannot be regarded as a lining unless backed in puddle clay, used in soils of low mass permeability, and / or clutch sealant such as ‘Wadit’ or ‘Britseal’ is used.

4.13. Bank Protection

Many forms of existing bank protection are encountered and have to be tied into the new works. The interface will need to be detailed to prevent an erosion pocket forming.

It is often necessary to use a structural system of bank protection, such as interlocking sheet steel piling, for instance to act as a cofferdam to allow bridge footings to be built below water level or to allow British Waterways plant to pass along the towing path under a new bridge. Piling is also used in open cut service crossings to act as a water cut-off. Non structural systems require the canal bank to slope into the channel and navigation must be considered in the design.

Although galvanised trench sheets are often used on smaller canals without pile capping, it is usual to install a reinforced concrete capping beam to structural piles. This beam should generally be made to accord visually with vernacular building materials for instance by laying brick or stone masonry to the upper face and fendering the vertical face.

Concrete and masonry walls are sometimes used but are difficult to construct without dewatering.

Although the nature of the Works often dictates a 'hard' bank protection system, there are landscape and ecological issues raised. 'Soft' systems which allow a natural vegetation to develop at the water's edge should be employed wherever possible. A range of techniques are available, including reed planted coir fibre rolls, brush wood rolls and hazel wattles. Sometimes timber washboards, gabions and stone filled mattresses, pitching and dry stone walls are appropriate. Guidance is contained in the Environment Agency R&D Publication No. 11 *Waterway Bank Protection: A Guide to Erosion Assessment and Management*.

The interface between the water's edge and the canal bank is one of the most valuable of the waterway habitats. Where installation of bank protection will involve disturbance to this area, surveys for the presence of water voles or white clawed crayfish are required at the early stages of the project. If found, the method of bank protection must be agreed with the Engineer to ensure their habitat is conserved, as required by law. In addition, all soil and plants (including reeds and aquatic vegetation) which are removed should be reinstated adjacent to the works. Where original plants cannot be reinstated equivalent planting agreed with the Engineer must be carried out.

In addition to the effects on flora and fauna existing between the water's edge and the canal bank, disturbance of the bank can lead to increased sediment flow into the canal/reservoir itself. This should be managed in order to reduce the impact of sediment on the waterway habitat. Appropriate erosion protection measures and work practices should be employed to reduce this environmental risk.

Future maintenance of bank protection systems must be addressed at the design stage.

4.14. Fendering

The permanent and temporary works must be fendered to protect the Works from craft *and vice versa*. Modern narrow canal craft have overhanging bows and the steering skill of some boatmen leaves something to be desired. Fendering materials include cast iron (used sometimes for heritage reasons), steel bullhead

rail, recycled timber or timber obtained from legal and sustainable sources, polyethylene (which has low friction properties) and polyethylene faced rubber (which absorbs energy). The durability and maintenance of fendering must be considered and addressed at the design stage.

Bolt heads must not project. There should generally be no external angles; radii should be employed.

4.15. River Navigations

River navigations are affected by currents, floods and in some cases tides. There will be a deep navigation channel, not necessarily in the centre of the river. Elsewhere there may be insufficient depth to navigate. It is less easy to control vessels travelling in the same direction as the flow than those travelling against it. The former can move at considerable speed and need sufficient visibility and space to manœuvre. Temporary and permanent works in the river can produce turbulence affecting navigation. The effects will vary in different river conditions. Environment Agency / SEPA consent as drainage authority will be needed as well as that of British Waterways as navigation authority. The effects of all works on river navigations will need careful and specific consideration. Sailing vessels use some river navigations.

British Waterways has powers and duties a Navigation Authority on those rivers listed in Statutory Instrument No 1195 *The Inland Waterways of the British Waterways Board Order 1965.* British Waterways is usually the freeholder for artificial sections but in general not so for natural river channels. Where British Waterways is not the landowner, there will be no need for a contract with the Promoter however the principles of this Code will apply, particularly with regard to the contents of the Submission. British Waterways has Bye Law powers to control works affecting river navigations. The procedure outlined above must be followed except where it refers to the contract.

4.16. Services

The Promoter must enquire of the appropriate authority as to the location of, and the need to protect or divert any pipe or service, and take all reasonable steps to ensure that these are not damaged and is to arrange to repair or replace any damaged services. When required, British Waterways will endeavour to inform the Promoter of such service information British Waterways may have, but the Promoter is advised to make his own extensive searches and enquiries as British Waterways' records cannot be relied upon.

The Promoter should be aware that fibre-optic telecommunication cables are situated in many canal towing paths. The Promoter must ensure that this network is protected from the effects of the Works. Detailed consultations, prior to work commencing will be needed to ensure this is so. There is a telephone number for Easynet (formerly Ipsaris and Fibreway) in Appendix 8.

The towing paths are also used as routes for services such as oxygen mains, oil pipelines and 'Government apparatus'. This equipment must not be overlooked.

Services such as electrical cables pose a threat to life. In addition repair and loss of revenue costs resulting from damaged services are substantial.

4.17. **New Roads & Street Works Act**

Where services are being installed across British Waterways' structures under the above statute, the principles of this Code, will apply, particularly with regard to the contents of the Submission.

4.18. **Discharges and Abstractions**

No water abstractions or discharges (permanent or temporary) are permissible without British Waterways permission. If British Waterways does accept a temporary installation, it will be subject to separate engineering approval and commercial contract.

In some circumstances separate authorisation from the Environment Agency (Scottish Environment Protection Agency in Scotland) is needed.

Consultation with the Environment Agency (Scottish Environment Protection Agency in Scotland) is recommended. The Promoter should demonstrate to British Waterways that these consultations have taken place.

It is possible that there are abstractions from, or discharges to British Waterways or neighbouring waters which may be affected by the Works or which may affect the Works. The Promoter should make inquiries, to establish whether such abstractions or discharges exist. Where they do exist, the Promoter should discuss the Works with the abstractor or discharger with a view to making suitable arrangements.

4.19. **Disposal of Waste**

The Promoter shall make all necessary arrangements for the disposal of waste materials leaving site in accordance with current legislation.

Promoters should be aware that silts and other materials recovered from canal beds or elsewhere might contain chemical contaminants, or biohazards such as used hypodermic needles. The necessary steps must be taken to identify the nature and degree of contamination and dispose of such wastes appropriately to a site identified to the Engineer. Compliance with the requirements of the relevant statutory bodies, must be demonstrated to British Waterways.

Desk studies and site investigations are required to identify contaminated land issues in advance of the works. A waste management plan to deal with resulting issues must be drawn up and agreed with British Waterways.

Where contaminated material is exposed during works, steps must be taken to protect workers and the public from contact with the material or with gases or liquids arising from it.

The Promoter is encouraged to recycle construction waste, where appropriate. See Section 4.37.3.9 for further detail.

4.20. **Stability of Structures**

Many existing structures were built before slope stability, foundation design etc were understood. Materials and methods now taken for granted were not available. Compaction of embankment fill was not possible. It was not practice to prepare engineering drawings until the 1820's. Calculations were not undertaken until later in the 19th Century.

Old structures often have factors of safety close to unity. Factors of safety for embankments and cuttings reduce with time. Old structures are therefore particularly vulnerable to nearby works. Ill-considered excavations at the toe of an embankment, for instance, can have disastrous consequences.

All work near old structures must be carried out with great care and forethought. It is the Promoter's responsibility to demonstrate that there will be no detrimental impact on existing structures.

4.21. **New Aqueducts, Locks etc**

If it is necessary to build a structure which is of major significance to British Waterways such as a new lock, a canal re-alignment, a mooring basin or the construction of a new aqueduct carrying the canal over a road, watercourse etc, British Waterways reserves the right to carry out the design and supervise the construction on behalf of the Promoter

4.22. **Heritage structures:**

Many elements of the waterway fabric are 200 years old. The following two sections deal with statutory controls on Listed Buildings and Scheduled Ancient Monuments. Even where no statutory protection is in force we seek to protect and enhance all structures, surfaces and features with heritage / historic value.

4.23. **Listed Buildings**

Many waterway buildings and structures are listed buildings and are subject to historic building legislation. Works to listed buildings often require listed building consent from the local planning authority and this should be negotiated and applied for well in advance of any works. Works to adjoining non listed structures may also be classed as 'development affecting the setting of a listed building'. Listed buildings also enjoy a measure of 'curtilage' protection.

4.24. **Scheduled Ancient Monuments**

A number of waterway sites and structures are scheduled monuments and are protected under special legislation. Many works affecting them require scheduled monument consent which must be obtained from the appropriate Secretary of State, via the statutory agencies (English Heritage, Historic Scotland, Cadw). Gaining scheduled monument consent can take time. Works to scheduled monuments almost always require archaeological recording conditions to be met.

4.25. **Conservation Areas**

Conservation Area controls affect many waterway sites and early consultation with the local planning authority is advised before works take place in a conservation area. Demolition of any building or structure (whether listed or not) may require conservation area consent. Felling, lopping or topping of trees calls for six weeks notice to be given to the local planning authority.

4.26. **Setting and character**

While it is difficult to define “character” objectively; any repair, refurbishment or new build should be carried out so as to be in keeping with the general setting and landscape of the waterway corridor.

Selection of materials should seek to match existing or surrounding styles and reinstatement of the site should take account of the need to restore the overall setting of the waterway (for instance replacement or enhancement of vegetation, historic surfaces or features).

4.27. **Archaeology**

Archaeological remains associated with waterways represent an important and finite resource. They may comprise buried remains of past waterway structures such as old basins, now infilled; or they may be remains of activities that took place alongside the waterways such as water mills, pumping stations, warehouses and 'ridge and furrow' fields.

Sites of archaeological interest may be Scheduled Monuments or may appear on the County Sites and Monuments Record

It is British Waterways’ policy to ensure that archaeological remains are not destroyed or unnecessarily removed. Offsite preservation and re-use of complete structures must be considered, where applicable. The archaeological recording of structures to be demolished must be undertaken, where applicable. Artefacts should be preserved. British Waterways retains ownership of such materials.

4.28. **Demolition Materials**

British Waterways requires that materials, re-usable for waterway works, particularly those, which are no longer readily available, such as copings and castings, be carefully removed and transported to a storage area for use in canal maintenance. British Waterways retains ownership of such materials.

See Sustainable Deconstruction for further information.

4.29. **Biodiversity**

There is a great variety of wildlife along the inland waterway network. British Waterways has committed itself to developing a Biodiversity Action Plan (BAP) for each of its Waterways, which will identify objectives for species and habitats in need of protection and enhancement. These plans should be consulted when carrying out any environmental appraisals.

The following sections deal with statutory controls on protected sites, protected species, trees and hedgerows and invasive species.

4.30. **Protected Sites**

Some of our waterways and adjacent land is designated under UK legislation as Sites of Special Scientific Interest (SSSI). Some SSSIs are further protected by European law. Consultation with English Nature (or Scottish Natural Heritage or Countryside Council for Wales) is required before any Potentially Damaging Operations identified in each SSSI Notification is carried out. Early consultation with British Waterways is therefore essential where a SSSI may be affected. As a public body, British Waterways now has a statutory duty to manage its SSSIs positively for nature conservation, so opportunities for enhancement may be sought when works are planned.

4.31. **Protected Species**

Several plants and animals (including birds) which occur on the waterway network are legally protected. These include Floating Water-Plantain, Bats, Badgers, Otters, Water Voles, native Crayfish, nesting water birds and Great Crested Newts. There are statutory requirements relating to the conduct of works, which may affect protected species or their habitats. Formal consent is often required from English Nature (or Scottish Natural Heritage or Countryside Council for Wales) before any work, which may affect a protected species, or its habitat can be carried out.

Bridges, walls, large culverts and other structures have been found to be ideal bat roosts, especially where there are small crevices leading to voids within the structure. It is an offence, intentionally or recklessly, to damage or destroy any structure used by bats, or to disturb them whilst occupying the structure. Professional surveys of existing structures are recommended at an early stage of any widening or refurbishment scheme to avoid delays.

Where a species protected by European legislation may be affected, consent is required from the Department of Environment, Food and Rural Affairs (in England), the Scottish Executive, or the National Assembly for Wales.

4.32. **Trees and Hedgerows**

Under Town and Country Planning legislation, trees may be protected by Tree Preservation Orders or by virtue of being in Conservation Areas designated by the Local Authority. Written consent must be obtained from the relevant Local Authority prior to any work on protected trees, and care must be taken with the methods of working to avoid unnecessary damage to the tree.

Under the Hedgerow Regulations 1997, most countryside hedgerows are legally protected from removal without the written consent of the local authority.

Trees and hedgerows can also be damaged by the tracking of heavy plant or excavation around the roots. Works in proximity to trees should be carried out in accordance with BS 5837: 1991 Trees in relation to construction and the National Joint Utilities Group Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees. (Publication No. 10, 1995)

4.33. **Invasive Species**

Three invasive weeds are a cause for concern along waterways - Giant Hogweed, Japanese Knotweed and Himalayan Balsam. These plants spread rapidly by colonising disturbed ground and can be distributed by water, and in soil or waterway sediments. Under the Wildlife and Countryside Act 1981, it is an offence to plant or cause Japanese Knotweed or Giant Hogweed to grow in the wild. See Environment Agency leaflet *Guidance for control of invasive plants near watercourses.*

If invasive species need to be removed, they must be disposed of responsibly.

Some non-native animals are also of concern, principally the zander (a fish), and three species of crayfish – noble, signal and turkish. It is an offence to introduce these species into the wild, so if they are caught, e.g. as part of a fish rescue or survey, they should be humanely killed.

4.34. **Publicity**

Press and publicity contacts, regarding the intended Works must have the approval and prior knowledge of British Waterways if in any way they affect the canal or river.

4.35. **Signs**

Site signs of agreed format should be erected indicating the organisation responsible for the Works including a description of the Works and telephone numbers for twenty four hour emergency contact and provide an apology for disruption caused to British Waterways' customers. Appropriate wording may be required regarding British Waterways' involvement with the project.

4.36. **Works to the Engineer's Satisfaction**

All work shall be properly completed and full reinstatement carried out to the satisfaction of the Engineer before the Promoter's contractor leaves the site. All contract work and reinstatements shall have a maintenance and defects correction period. (Normally one year for hard landscaping, building and engineering works and three years for soft landscaping (including replacement of dead or damaged flora)).

When re-seeding or planting trees or shrubs, native seed or plants of local provenance should be used. Species which reflect the local flora should be selected.

4.37. **Sustainable Development Considerations**

Sustainable development, or sustainability, is all about ensuring a better quality of life for everyone, now and for future generations to come.

British Waterways has a corporate commitment to maintain and develop Britain's inland waterways in a sustainable manner so that they fulfil their full economic, social and environmental potential.

British Waterways has identified four objectives in relation to sustainable development:

1. Effective protection of the environment;

2. Minimising waste and using energy and resources effectively;
3. Recognising the needs of everyone;
4. Maintaining economic growth and employment.

As part of this commitment BW now uses Forest Stewardship Council (FSC) certified timber where possible, it has targets for the use of recycled aggregates and every major engineering project undergoes a sustainability review.

Where proposed third party works affect waterways, the Promoter is required to consider the following sustainability issues and demonstrate aspects where appropriate, via the Notification Form submitted to British Waterways.

4.37.1. **Social**

The Promoter is required to consider the following social issues as part of any proposed works affecting British Waterways.

4.37.1.1. *Access for All*

British Waterways has a corporate priority to encourage the use of its network of canals and rivers by people with disabilities. British Waterways also recognises its responsibilities under the Disability Discrimination Act to take reasonable steps to improve access to its waterways and associated services (including works undertaken by third parties).

Where works affect British Waterways, the Promoter is required where possible to provide suitable access for all people. The Promoter is required to demonstrate to British Waterways that the access needs of all people will be met during and after construction, where the project allows.

4.37.1.2. *Community Consultation*

Consultation with various community groups is an important planning issue for any new development. With works affecting the British Waterways network and infrastructure the Promoter is required to consult with various groups to gain approval for the proposed development and to assure user groups that the development will not adversely affect the waterway environment and associated uses. Community consultation will also be integral to delivering a project that considers the needs of all people, e.g. consult with people with disabilities to ensure that local needs are taken into account.

4.37.1.3. *Vandalism*

A significant social issue is potential damage to works, equipment and the environment due to vandalism. In particular damage to plant and equipment or fuel storage tanks can be costly in both financial and environmental terms. The Promoter is responsible for all fuel, oil and chemicals that are present on the site and for their appropriate containment. The Promoter should be aware of its legal obligations in regards to a pollution incident. Measures should be implemented to reduce the risk of vandalism on-site including risks to British Waterways infrastructure and the waterway environment.

4.37.2. **Economic**

British Waterways encourages projects which promote local economic growth and employment. As a result the Promoter is encouraged to utilise local labour and materials within the project that affects British Waterways, where appropriate.

4.37.3. **Environment**

The Promoter is required to consider all potential environmental impacts throughout the life of the project, and to demonstrate to British Waterways that all

potential environmental risks that affect British Waterways will be mitigated. Environmental risks and control measures will be identified via the completion of a preliminary appraisal.

Where works affect British Waterways, the Promoter is encouraged to work in a sustainable manner and is required to consider (and demonstrate where appropriate) the following issues.

4.37.3.1. *Flora and Fauna*

- Fishery
- Protected Sites
- Protected Species
- Trees and Hedgerows
- Invasive Species

4.37.3.2. *Heritage Structures*

- Listed Building
- Scheduled Ancient Monuments
- Conservation Areas
- Setting and character
- Archaeology

4.37.3.3. *Prevention of Pollution*

The following are considerations for the prevention of pollution from major construction sites:

- Air Quality – To ensure there is no health risk or loss of amenity due to emission of exhaust gases to the environment, ensure that all vehicles and machinery are fitted with emission control equipment and are maintained and serviced on a regular basis. In addition, consideration should alo be given to the potential for odorous gases being released from the site (e.g. the unsurfacing of old tips or odorous wastes).
- Stormwater Management – Employ appropriate measures to manage contaminated runoff and train staff to be responsible when disposing of paints and other chemicals.
- Sediment Control – Water containing silt should never be pumped directly into a river, stream or surface water drain. All discharges off the site will require Environment Agency approval. Minimise the impact of contaminated runoff on receiving waters by employing erosion and sediment control measures, if possible before construction. The Environment Agency recommends the following measures for controlling sediment pollution at construction sites:

    1. For excavations use cut-off ditches to prevent entry of surface water and well point dewatering or cut-off walls for ground water
    2. Stockpiles can be seeded or covered, and silt fences constructed from a suitable geotextile may be useful
    3. Suitable treatment of silty water will be required on construction sites, which could involve the use of a settlement lagoon or tank or grassed area (of sufficient capacity).

Any measures installed require adequate inspection and maintenance, particularly after a storm event. Where these measures are put into place, the Promoter / Contractor must assess the effectiveness of sediment control measures and make improvements to ensure their efficiency.

For Environment Agency references see Appendix 7 – References for Sustainable Projects.

- Contaminated Soil – Ensure that all contaminated material uncovered (e.g. dredgings) on a construction site are excavated and disposed of in a environmental and sustainable manner and in compliance with current legislation.
- Dust Control – Ensure there is no health risk or loss of amenity due to emission of dust to the environment. The main dust suppression method is to apply water to exposed areas when visible dust is observed.
- Noise – In order to ensure nuisance from noise does not occur fit and maintain appropriate mufflers on earth-moving and other vehicles on the site, and enclose noisy equipment (where appropriate). The Promoter should be aware of the operating hours of the location of the works to minimise the effect on nearby residents. Where appropriate, the installation of noise attenuation barriers may be required, particularly when working in close proximity to residential areas (including schools and office buildings).
- Storing Fuels and Chemicals – Ensure that fuel and chemical storages are safe, and that any materials that escape do not cause environmental damage. Suggested control measures include; minimising fuels and chemicals on-site; installing bunds to reduce the risk of spills; having designated re-fuelling and equipment maintenance areas and implement a contingency plan to handle spills, e.g. train staff in the use of on-site spill kits. In the case of hazardous chemicals being allowed on site, the relevant COSHH information should be kept on site and a properly maintained chemicals inventory.
- Road Cleaning – Ensure roads are kept clean of soil, which could otherwise contaminate nearby water bodies. All points on the site where vehicles regularly leave should have rumble grids installed. The Environment Agency advises that the inclusion of small dams in roadside ditches may assist silt retention, especially on steep slopes.

4.37.3.4. *Erosion*

The following should be considered to minimise the quantity of soil lost during construction:

- Schedule measures to avoid and reduce erosion by phasing the work programme to minimise land disturbance;
- Where possible, keep the areas of land cleared to a minimum;
- Protect slopes and cleared areas with appropriate geotextile products and vegetation;
- Rehabilitate cleared areas promptly; and
- Restrict vehicles to designated haul roads to avoid erosion of the site.

See above for further information on Bank Protection.

4.37.3.5. *Water Use*

As part of the principles of sustainable development, the Promoter is encouraged to consider the efficient use of water during construction and throughout the life of the project.

- Design Measures – Good building design can greatly reduce the amount of water used. Water efficient design measures include installing water efficient fittings and appliances to reduce demand. The use of alternative water sources such as rainwater and greywater (typically wastewater from the laundry & bathroom) will also reduce the demand on potable water supplies. British Waterways also has specialists in the area of water management issues.
- Sustainable Drainage (SUDS) – SUDS techniques allow natural drainage processes to function in the landscape surrounding development and include: filter strips and swales; filter drains and permeable surfaces; infiltration devices; ponds and basins.

For references refer to Appendix 7 – References for Sustainable Projects.

4.37.3.6. *Energy Use*

As part of the principles of sustainable development, the Promoter is encouraged to consider the efficient use of energy throughout the life of the project. This will decrease the use of fossil fuels and contribute to the reduction of greenhouse gases to the environment.

- Energy Efficiency in Design – e.g. maximise natural sunlight and ventilation, installation of energy efficient lighting, heating systems and other equipment.
- Consideration of alternative energy sources within the project, e.g. solar panels, to reduce consumption of valuable fossil fuels and decrease emissions of greenhouse gases to the environment.

4.37.3.7. *Green Procurement*

As part of its commitment to the environment British Waterways has developed policies and operating procedures in relation to the procurement of sustainable materials. Where third party works affect British Waterways, the Promoter is required to consider the purchasing of recycled materials for use within the proposed development. Where works are adjacent to the waterway environment, environmentally sensitive materials will be implemented at all times. The following are examples of such materials:

- Timber – Recent regulations have restricted the sale and use of timber treated with creosote or chromated copper arsenate (CCA). As of June 2004, it is an offence to place CCA treated timber on the market for any application where there is a risk of repeated skin contact, for use in marine waters, inside of building and for agricultural purposes other than for livestock fence posts and structural uses. The Promoter should be aware of this new legislation when purchasing timber. Refer to British Waterways ' Restrictions on the Use of Treated Timber for further detail, where available.

  In addition sustainable procurement of timber is a high priority objective for British Waterways. Where third parties are working on our premises British Waterways requests the specification of "properly certified and approved timber, from well managed forests, which can demonstrate sustainability", wherever possible, e.g. the Forest Stewardship Council (FSC) has the

objective of promoting environmentally responsible, socially beneficial and economically viable forest management.

- Aggregates – British Waterways has a corporate commitment to increase the use of recycled and secondary aggregates within British Waterways major works. The Promoter is to use recycled aggregates within developments where appropriate. This increased use of recycled aggregates reduces the amount of waste materials being sent to landfill.

For references refer to Appendix 7 – References for Sustainable Projects.

4.37.3.8. *Sustainable Deconstruction*

see also Specific Requirements for Demolition

Sustainable deconstruction is the process of carefully dismantling a building in order to salvage components for reuse and recycling. While traditional demolition is highly mechanised, capital-intensive, and waste generating, deconstruction (combined with demolition or used as an alternative) supports community development with environmental, economic and social benefits, including:

- Reducing pollution, greenhouse gas emissions, and the need for landfill and incineration;
- Conserving energy and natural resources;
- Creating job training and employment opportunities;
- Improving the triple-bottom line through avoided waste disposal and/or demolition costs;
- Generating revenue from salvaged building materials; and
- Salvaging high-quality used building materials for reuse in new construction or renovation projects.

In a deconstruction, hazardous materials are removed, reusable structural and/or non-structural building materials are salvaged, demolition materials are recycled and only a small percentage of demolition waste typically ends up in landfill.

The following steps should be taken to successfully deconstruct buildings for salvage and recycling:

1. Identify Salvage and Recycling Opportunities: The amount and type of materials that can be salvaged/recycled depends on time available, type, size and condition of the building and the existing markets for the materials.
2. Plan for Deconstruction: The Contractor should prepare a plan for deconstruction including; assessment and abatement of hazardous materials, type & number of materials for reuse, quantities of materials for recycling, on-site procedures for separating recyclables, quantities of waste to be disposed, and details of recycling and disposal facilities.
3. Schedule Time for Deconstruction: Deconstruction is more labour-intensive than conventional demolition. Allowing a suitable time frame for deconstruction results in reduced waste disposal costs and potentially more revenue from salvaged materials (or a reduced cost if reuse of materials).
4. Monitor Salvaging and Recycling Activities: This will ensure materials are salvaged, recycled and disposed of as specified.
5. Evaluate Project Performance: This will assist in measuring performance against any set targets. Where this method is employed, the Contractor

should keep records of the volume/quantity of materials recycled and disposed of & the name and location of recycling or disposal facilities.

For large value projects contractors should follow the DTi voluntary Code of Practice, *Site Waste Management Plans, Guidance for Construction Contractors and Clients, 2004* (This document covers the topics of waste minimisation on construction sites, and the need to reduce waste material going to landfill sites, following the implementation of the EU Landfill Directive.). For low value projects the same principles can also be followed.

The waste management hierarchy given below should be followed:

Reduce waste	Most sustainable
Re-use materials	
Recover / Recycle	
Disposal	Least sustainable

4.37.3.9. *Waste Management*

To minimise waste generation throughout the construction phase, reuse/reduce/recycle construction and demolition waste where practicable, and incorporate waste minimisation targets and measures into the planning phase. Opportunities for waste minimisation include the following:

- Obtain construction materials, paints, lubricants and other liquids in reusable packaging or containers;
- Where possible, purchase pre-fabricated materials;
- Send waste concrete from demolition activities to a concrete recycler instead of landfill;
- Where possible, provide receptacles for the segregation of solid waste generated by construction activities and offices to be collected for recycling;
- Use overburden to construct temporary noise barriers; and
- Collect lubricating oil from the construction vehicle fleet to send to a recycler.

4.38. Suspension of Work

If he considers the Waterway, Waterway users, or environmental or heritage features are at risk until his reasonable requirements or conditions have been met, the Engineer reserves the right to order operations to be suspended and cannot accept any liability for any costs or claims which may be incurred by the Promoter as a result.

4.39. Notice of Works Contract Maintenance and Defects Correction Period

The Engineer shall be given twenty eight days notice of the end of the maintenance Defects Correction Period of the Works Contract and/or seven days notice of any meeting in connection therewith, to enable an inspection to be made to ensure all outstanding works have been completed.

4.40. **Further Works**

No works of maintenance, alteration or demolition may be carried out unless further submissions have been agreed and a new Contract formed, where required.

4.41. **Promoter's Safety File**

The Promoter's Safety File should include reference to this Code or a statement that British Waterways' agreement must be obtained before any works of maintenance, alteration or demolition are undertaken, and that new submissions, along with a Safety Plan needs to be agreed by the Promoter or his legal successor.

4.42. **'Special Requirements in relation to the British Waterways Board'**

The Promoter's attention is drawn to this section. The requirements of British Waterways with regard to working near to the waterway are defined in this Appendix. The Promoter should include these clauses in the Works Contract and ensure that the Contractor complies.

5. SPECIFIC REQUIREMENTS FOR BRIDGES

5.1. **Introduction**

5.1.1. This section refers to new bridges, bridge widening, major bridge refurbishment, temporary bridges and conveyors.

5.1.2. Proposals for constructing new bridges or altering existing bridges across Waterways are conducted in four distinct phases

- feasibility
- design
- construction
- maintenance

5.1.3. Feasibility and design are essentially iterations of the same process. Within this document these steps are not listed separately. It is imperative that all pertinent aspects relating to the interests of British Waterways are identified at an early stage.

5.1.4. There are aspects of construction and future maintenance, which need to be considered at the feasibility and design stages.

5.2. Feasibility And Design

5.2.1. The bridge site should be selected by considering the needs of the proposed scheme and also the effect of the bridge on the canal corridor. The latter criterion will include consideration of the following:

- navigational needs:- locations adjacent to existing locks, bridges, bends etc. should be avoided where possible.
- environmental and landscape impact on the canal corridor.
- the needs of towing-path users (including those with disabilities); vehicles may be used for towing-path maintenance or access.
- the protection and / or relocation of services in the towing path
- deterrence of vandalism

5.2.2. The use of Design and Build contractors needs careful consideration. Unless the critical parameters are defined before a contractor is appointed, an unsatisfactory result and/or escalating costs to the Promoter will result. The concept should be considered as 'Detail and Build' not 'Design as you Build'. The Promoter remains responsible for the proposals.

5.2.3. Navigational clearances need to be established. These will vary from navigation to navigation and from site to site owing to considerations of craft dimensions, one or two way boat working, horizontal alignment and visibility, proximity to other structures, dredging and other maintenance activities. In each case the Engineer will define the following.

- headroom over navigation.
- headroom over towing-path.
- navigation width.
- towing-path width.
- navigation depth.
- forward visibility.

Headroom will normally be defined relative to maximum navigable flood level on river navigations or overflow weir level on a canal navigation. On river navigations the clearance must be maintained over the full width of the navigation channel.

In mining subsidence areas, a means of maintaining headroom such as jacking plinths, must be provided

Minimised headroom leads to difficulty in maintaining the Waterway and building and maintaining the bridge. These problems include:

- temporary works clearances during construction.
- temporary works clearances during maintenance.
- access for dredging plant.

If sufficient headroom for these purposes cannot be achieved, a low maintenance structure is needed.

Dredging can sometimes be addressed by separating carriageways, or by providing alternative means of dredging other than the use of waterborne plant.

In order to maximise the time before dredging becomes required it may be necessary to dredge before construction.

Where dredging occurs, ensure that the dredged material that requires disposal is done so in an environmental and sustainable manner and in compliance with current legislation for contaminated material.

Headroom clearances relating to arched bridges need careful consideration. A profile, which will achieve the desired visual and clearance objectives, is needed. It is usual to use parabolic arches, with raised and set back spring points to achieve the optimum result.

Super elevated roads requiring bridges with less than generous headroom should be avoided, because of safety considerations. Boaters can be misled regarding the clearance and be unprepared for the headroom reduction.

5.2.4. The Engineer may require physical or mathematical modelling of the navigation to ensure that safe passage of craft can be maintained at all times.

5.2.5. If the Engineer permits any narrowing of the canal, such narrowing will normally take place symmetrically about the centre line of the navigation. The alignment of the canal banks is of particular interest to British Waterways. The drawings must illustrate a sufficient length of the canal to enable the realignment works to be viewed in context.

5.2.6. Consideration must be given to aspects of the forward visibility for navigators and towing-path users. It may, for instance, be necessary to increase the span of a bridge when a new structure is constructed in the vicinity of a bend on the navigation.

If it is essential to build bridges in close proximity to locks it may be desirable to increase the vertical clearance or install open parapet rails in order that vessels approaching the lock from below can determine in advance if the lock is in use.

5.2.7. Bridges across river navigations should generally clear the navigation in a single span. Where it is necessary to have piers within the river, special attention will be needed to ensure that such piers have a minimal effect on the navigation and are adequately fendered, signed and lit. Aspects to be considered include:

- clearances.
- proximity to adjacent structures.
- speed of flow in flood conditions & scour protection.
- fendering.

5.2.8. Construction methods and the effect on navigation must be considered at the design stage.

The towing-path should generally pass under the same span as the navigation.

The towing-path under the bridge should be surfaced in material consistent with the character of the Waterway. Surfacing (including gradients, crossfall or width) should not hinder the use of the path by people with disabilities and should offer access compatible with or superior to surrounding towpath.

5.2.9. Weep holes should be laid to a backfall with drainage at the rear of the abutment.

5.2.10. In urban areas, where pigeon nuisance is a problem, the matter should be addressed through appropriate detailing.

5.2.11. Towing-path accesses from highways must be retained and should be improved or provided where appropriate. These should be enhanced for people with disabilities, where possible and appropriate

5.2.12. There should be no 'dead areas' prone to vandalism in towing-paths under bridges.

5.2.13. It is preferable that there be no pedestrian access to offside abutments of canal bridges in order to prevent graffiti.

5.2.14. Bridges over 15m in length will be treated as tunnels as far as safety precautions are concerned.

5.2.15. It will generally be necessary to provide bank protection, durable for the life of the bridge, under the new bridge owing to considerations of:

- increased navigation depth
- difficulty in installing such protection later in limited headroom circumstance.
- protection of the structure from scour.
- fendering.
- support to the towing path
- the new bank protection must interface with the existing with a detail designed to minimise the possibility of erosion and leakage at this point.

Piles should be capped to match the local vernacular – see above

Mitigation measures may be needed where bank protection results in damage to wildlife habitats– see above

5.2.16. Bridge abutments and spans have been found to be ideal bat roosts, especially where there are small crevices leading to voids within the structure. It is an offence, intentionally or recklessly, to damage or destroy any structure used by bats, or to disturb them whilst occupying the structure. Professional surveys of existing structures are recommended at an early stage of any widening or refurbishment scheme to avoid delays. Where possible the provision of bat habitat within or near to bridges should be considered in bridge design.

5.2.17. The noise impact upon the canal environment resulting from the new bridge crossing must be considered. If noise levels are too great mitigation measures must be introduced.

5.2.18. It may be necessary to erect noise mounds or barriers. It will generally be preferable to have solid parapets.

5.3. Aesthetics

5.3.1. The impact of the bridge on the canal environment will require detailed consultation. Not only are bridge aesthetics of great importance but also the setting of the bridge on the local and wider landscape must be considered. Off site planting should be considered.

5.3.2. When considering the aesthetics of the bridge there are two main options. The bridge should either be a striking dramatic modern structure or it should reflect the scale, style material, proportions and heritage of the navigation as a whole. In either case British Waterways requires a high quality, well designed and detailed proposal.

5.3.3. The canal corridor is a linear one. Bridges are seen by canal users as part of a sequence of structures, most of which are contemporary with the construction of the canal. Users view bridges at leisure whether travelling on foot, at walking pace from a boat, fishing at close quarters or from a distance.

5.3.4. Aspects which will be discussed with regard to bridge aesthetics include:

- expression of function e.g. a beam bridge should not have false arch facades.
- scale, proportions and mass.
- order - avoid chaos.
- materials and facings. there is a presumption towards an appropriate brick or stone. the facing material and bond pattern, which will reflect local themes, must be selected in agreement with British Waterways before a contractor is appointed. Where appropriate, the incorporation of recycled materials should be considered by the Promoter. The sourcing of local materials is also important in achieving a sustainable project.
- colour
- architectural features such as string courses, pilasters, pilaster caps and patterned brickwork; it is important that the bridge expresses its structural form and that such architectural features are inherent in the design and not "add-on extras".
- parapet type:-open parapets allow road users to view of the canal and have the advantage of a weight saving over masonry parapets. On small scale canal bridges solid parapets are usually appropriate. In some cases it may be appropriate to "box in" an open parapet above the deck with masonry parapets above the wing walls – the 'masonry book-end': in areas of high vandalism special measures will be needed to protect waterway visitors from abuse.
- wing wall direction and skew angle: the wingwall direction should generally be parallel to the transport mode being carried across the canal; wingwalls to skewed bridges must not be parallel with the canal; traditionally wingwalls are curved in plan and battered; consideration should be given to curved wing walls particularly on pastiche structures.
- the effect of road alignment and superelevation.
- embankment landscaping, which should be integral with the design of the bridge; native plants appropriate to the area and location should be used; if possible the planting should be carried out in advance of the works and should extend beyond the site to provide screening
- street lighting.
- bridge name/number and date plates.
- parapet/approach safety fence interface.
- towing-path lighting where appropriate.
- access ramps, steps, barriers, gates, stiles etc.

5.3.5. Computer generated images of proposed bridges gives an excellent view of the impact of new structures on the landscape and should be provided where necessary or on request.

Further reading on bridge aesthetics is available as follows:-

Highways Agency '*The Appearance of Bridges and other Highway Structures*' HMSO(1996)

Graham Tilly *'Conservation of Bridges'* (Gifford / Highways Agency) Spon (2002)

Fritz Leonhardt *'Brüchen Bridges - Aesthetics and Design'* - Architectural Press (1982)

Conference papers '*The Architecture of Bridge Design'* (1994)

Conference papers '*The Aesthetic Refurbishment of Bridges'* (1995)

Conference papers '*Good Looking Bridges'* (1993)

5.4. Construction

5.4.1. The design of the structure should take into account the bridge construction method.

5.4.2. Continuity of navigation and towing-path usage is presumed. Stoppages to navigation are only permissible if the Works cannot be undertaken without disruption to navigation traffic. The need for such stoppages must be identified and agreed at the design stage. It may be possible, in some circumstances, where it is necessary in the interests of safety or otherwise, to carry out a local towing-path diversion. Such a diversion should be safe, commodious, maintained and signed. Pedestrians should be allowed to use the towing-path as soon as it becomes possible for them so to do.

5.4.3. Bed profiling should be carried out before and after the Works in order to confirm that construction debris is removed.

5.4.4. It is usually possible to place bridge beams without interfering with traffic, by performing the lifts in the intervals between passing boats. In such circumstances a method statement will need to be agreed with the Engineer. Lookouts must be provided. The presumption is that canal traffic should not be delayed. Construction taking place adjacent to and above the navigation must be outwith the clearances specified at the design stage. Fendering, lighting, screening and signing will be necessary where appropriate.

5.4.5. Experience indicates that piling lines, which are acceptable on a drawing, are not satisfactory on site, without minor amendment. It is imperative therefore that all piling lines are agreed with the Engineer before piles are driven.

5.4.6. Throughout the construction phase all possible measures should be taken to reduce environmental impacts on the waterway and surroundings. Refer to Section 4.37.3 for suggested measures. Particular attention should be given to protecting the waterway environment and associated flora and fauna.

5.5. Maintenance

5.5.1. The bridge should be designed to minimise the need for future maintenance to those parts of the bridge, which affect navigation and to address how essential maintenance is to be carried out without affecting the interests of British Waterways.

Where permanent access gantries are provided, a full operational agreement with British Waterways is needed, even where there are generous navigation clearances. A safe system of work must be agreed, incorporating, where necessary, lookouts, catch nets etc. British Waterways must be advised when access gantries are to be used.

5.5.2. Method statements, programmes and temporary works drawings must be agreed before carrying out any significant aspects of bridge maintenance.

5.5.3. Hard and soft landscaping must be maintained in accordance with a predefined plan.

6. SPECIFIC REQUIREMENTS FOR SERVICE CROSSINGS

6.1.1. Introduction

This section refers to all services (e.g. pipes, cables etc.) installed beneath Waterways. See Section 8 for services beneath the towing-path.

This section primarily relates to canals, where considerations of integrity and water tightness are paramount. Some aspects are however relevant to river navigations.

6.1.2. Proposals for the installation, enlargement or maintenance of underground services should be considered in the following distinct phases:

- feasibility
- design
- construction
- maintenance

Feasibility and design are essentially iterations of the same process, and therefore the steps are not listed separately in this document. It is imperative that all relevant issues relating to the interests of British Waterways are identified at an early stage.

Also there are aspects of construction and future maintenance which need to be considered at the feasibility and design stages.

6.1.3. Overhead crossings are not permissible on environmental grounds. Whenever the opportunity arises to remove an existing pipe bridge, for instance when it is in need of renewal, the service will be diverted under the waterway

6.1.4. Crossings will normally be perpendicular to the waterway.

6.1.5. A number of techniques are available which enable the installation of services below ground. These techniques range from trenchless techniques to open excavation (including the “overlapping cofferdam” method).

6.1.6. Trenchless techniques will be presumed, but if such methods are not possible because of the particular site conditions, overlapping cofferdams or in particularly difficult circumstances trenching through a dewatered section of canal may be considered. However, attention is drawn to the standard stoppage conditions.

6.1.7. In some circumstances it may be possible to carry services in the surfacing over bridges, be they owned by British Waterways or others. It may also be possible to install ducts between beams. The option of external attachment should not be considered. British Waterways would raise strong objections on environmental and bridge maintenance grounds.

There is usually minimal cover over bridges. Services must be laid on sand to distribute loads. Services are likely to be disrupted by bridge maintenance.

6.1.8. General technical requirements for a variety of systems are given below. These notes are not exhaustive and each installation will be considered on a case by case basis.

6.1.9. Marker posts should be provided at the rear of the towing path and on the offside.

6.2. Feasibility & Design - All Techniques

6.2.1. In principle, services should be installed with the minimum of disruption to the Waterway, either during construction or during subsequent maintenance and use. In addition, normal operational activities such as bank protection and dredging should not be hindered by the presence of such installations.

6.2.2. The service crossing site should be selected by considering presumed or actual ground conditions, existing infrastructure and the needs of the underground service.

6.2.3. A site investigation will be required, involving a minimum of two boreholes (one on each side of the canal) to a minimum depth of 10m or 3m below the anticipated invert depth of the crossing, whichever is deeper. A depth profile across the full width of the canal or river will be required, showing the depth of water, the depth of silt and the level and material of the hard bed of the canal. The information should be related not only to Ordnance Datum but also to canal weir level, or in the case of a river low summer level. In mining subsidence areas the canal can be over 10 metres deep, sometimes part filled with loose unconsolidated settlement.

6.2.4. Because of their industrial heritage, land in the corridor of some waterways, including bed silts, may be contaminated. A contamination assessment is necessary before any works are carried out which involve the excavation or disturbance of potentially contaminated materials. Consultation with the Environment Agency (or Scottish Environment Protection Agency) is recommended.

6.2.5. It should not be assumed that there is any impermeable lining in the canal. See also above.

6.2.6. A drawing showing the boreholes, bed survey information and the profile of the service and a description and interpretation of the ground model, based on the site investigation, should be produced for the Submission.

6.2.7. After receiving copies of the logs of the boreholes, bed survey and such other information as he may require the Engineer shall inform the Promoter whether the proposed method of construction can be considered and, if so, if the proposed depth is acceptable. The depth given at this stage may be modified by the Engineer depending on the soil strata revealed in the thrust and reception pits, in trenchless systems or during piling for open excavations. If the method is not permitted or if the Promoter considers the depth too great, he should submit an alternative method of construction for the Engineer's consideration.

6.2.8. Before any disturbance is caused to the canal structure, the Engineer may require a line of permanent interlocking steel sheet piles or reinforced vegetative bank protection, usually for 10 metres from the centreline of the crossing should be installed to each side of the canal. This permanent piling may be required to provide an area of protection within the canal bank against possible leakage or breaching, or to relieve the need to pile subsequently in the vicinity of the crossing. Where piling is essential for design reasons it may be appropriate that they be hidden for landscape and environmental reasons. Permanent sheet piling must be agreed with the Engineer as to section, depth, alignment, capping, ties, anchors and marrying-in with any existing canal bank protection and shall be shown on the approved drawings. See also above

6.2.9. Permanent piling or walling, such as specified bank protection, must be designed by a competent person to withstand all external forces. The Engineer may require calculations. These calculations should clearly give design details of both the permanent and temporary conditions.

6.2.10. A suitable valve system, to enable a rapid shut down to be effected in the case of emergency, shall be provided where appropriate. The valves are to be fixed at least 5 metres clear of British Waterways' property.

6.2.11. Any sleeve or carrier pipe shall be capable of withstanding all normal canal, towing path and access road loading, and must extend to 3 metres beyond British Waterways' Property'.

6.2.12. Any concrete surround or sleeve must extend a distance or not less than 3 metres beyond either water's edge.

6.2.13. All electricity, telephone etc. cables should generally be placed within a strong and durable duct of galvanised steel, thick walled Polyethylene type or similar material. In the case of electricity cables, metallic ducts must be plastic lined. Normally all pipes will be grouted in position in the duct.

6.2.14. All pipes carrying pressurised material, which in the case of pipe failure may affect British Waterways' property, must at the Engineer's discretion be placed within a suitable sleeve or duct.

6.3. Feasibility & Design - Trenchless Techniques

Trenchless techniques are accomplished without excavation or disturbance, therefore reducing the overall operational, maintenance and capital costs associated with projects, while also minimising environmental concerns.

6.3.1. The principal criterion of British Waterways is leakage from the canal. Very small settlements can often be accommodated in the absence of structures. The Engineer may request settlement calculations.

6.3.2. Directional drilling has proved successful for small diameter flexible services such as cables and water pipes in soft and hard ground. Difficulties have been experienced with larger bores needing multiple reams.

6.3.3. Auger boring can lead to the creation of voids in granular ground and collapse of the bed has occurred.

6.3.4. Success has been achieved with earth-pressure balance micro–tunnelling machines used under unlined canals in soft ground.

6.3.5. When man entry techniques are proposed the safety of the miners must be paramount. Draining the canal may be considered.

6.3.6. If compressed air working is envisaged, the possibility of a blow out disrupting the bed and lining must be considered.

6.3.7. Difficulties of accuracy of the bore have been experienced when pipe ramming.

6.3.8. Pipe bursting of existing culverts is not normally viable due to considerations of disrupting the bed and creating an annular leakage path through the rubble.

6.3.9. In trenchless systems, the minimum depth to the crown of the pipe shall be of the order of 3.5 metres below hard bed level. This dimension will be varied as necessary depending on ground and trenchless techniques.

6.3.10. No part of a thrust or reception pit or shaft is to be nearer than 5.0 metres to waters edge.

6.3.11. The method statement must consider and address possible eventualities, such as seepage or leakage from the canal.

6.3.12. Pits or shafts should be raised by at least 300 mm above maximum canal water level, so that, if water from the canal were to enter the bore, it would be contained. In directional drilling a bund may be needed to contain leakage.

6.3.13. Any Contractor carrying out boring operations must be a member of the relevant approved trade association (e.g. the Pipe Jacking Association).

6.3.14. Where blasting is deemed necessary for the construction of the service the Promoter shall submit a full method statement which includes blasting arrangements and impact details. Agreement with the Engineer will need to be reached on frequency limits and the predicted Peak Particle Velocities. Vibrograph monitoring will be required during the Works.

6.3.15. Generally, back grouting of overbreak is necessary. The details of the proposed grout mix, phasing and pressures must be agreed. Mixtures particularly injurious to an aquatic environment should not be considered, although all cement based grouts are potentially polluting due to their lime content. Under no circumstances shall the pressure be allowed to exceed overburden pressure. Grouting records should be submitted to the Engineer as work proceeds. Constant monitoring of grout-take should be maintained and if there is any evidence of grout leak to the canal, the operation should be suspended immediately. If any leaks to the waterway are discovered they should be reported immediately to the Engineer who may have to inform the Environment Agency (or Scottish Environment Protection Agency).

6.4. Construction - Trenchless Techniques

6.4.1. The Engineer shall be given a minimum of 48 hours' notice to allow him to inspect:

- the location of sheet piling for the thrust and reception pits and their approach trenches before piling commences.
- the completed thrust and reception pits.
- the commencement of each bore.
- the completed work before the contractor leaves the site.

6.4.2. A record of the penetration of each pile in the thrust and reception pits and approach trenches as described above shall be kept on site and made available to the Engineer on request.

6.4.3. Pumping from any bore or pit is to be carried out only with prior consent from the Engineer and if found necessary, it must be passed through a settling tank to determine whether an undue proportion of fines is being withdrawn. Hoses are to be taken over the top of shafts and under no circumstances are holes to be cut in the piles. No contaminated water must be re-circulated to the canal. Environment Agency (Scottish Environment Protection Agency in Scotland) consent for the disposal of this water may be required.

6.4.4. The boring and jacking operation once commenced is to be continuous and carried out in accordance with safe, standard practice. Unless otherwise agreed 24-hour working will be required.

6.4.5. Where pipe-jacking, pipe ramming or auguring techniques are employed, it is required that the progress of the bore be kept under constant supervision, distances from the head of the boring pit are to be painted at 500 mm intervals on the pipes. The points at which the pipe shall pass beneath each of the two canal banks and the deepest part of the canal are also to be indicated on the pipe.

6.4.6. Where an approved directional drilling technique is employed, constant monitoring shall be carried out in order to confirm the depth and alignment of the bore.

6.4.7. Surface monitoring of settlement will generally be required.

6.4.8. In no circumstances must an auger be projected forward of the jacking shield.

6.4.9. In the event of canal water appearing at the face of a tunnel or in the boring pit in remote techniques, work may continue if appropriate and whatever action is necessary must be taken, but the Engineer should be notified immediately. Faces Boards shall be available for boarding up the exposed face of a thrust bore or tunnel.

6.4.10. In the event of a bore proving abortive, work shall not be recommenced until after the Engineer has accepted alternative proposals. In such cases the pipe is to remain in position and be filled along with any overbreak with grout of an agreed mix.

6.4.11. The removal of piles and backfilling and adequate backfilling of pits employed within the Works and associated reinstatements is to be carried out to the satisfaction of the Engineer, in order that support is not lost.

6.4.12. The Engineer shall be empowered to order the work to be suspended at any stage for any express reason and this instruction must be acted upon immediately. The Engineer shall not accept any liability for any costs or claims, which may arise by the Promoter as a result.

6.5. Feasibility & Design - Overlapping Cofferdam

6.5.1. Uninterrupted passage of craft on the Waterway is to be maintained at all times. The cofferdam is to be constructed in two stages using the overlapping method. In certain cases it may be necessary for some dredging to be carried out to ensure that a navigable channel is maintained around either the first or second stage of the cofferdam. The necessity for this shall be determined beforehand by taking soundings of the canal depth but under no circumstances should dredging be carried out without the agreement of the Engineer and then only under his supervision.

6.5.2. Where dredging is found to be necessary, consideration shall have to be given to the stability of banks or bank protection, which may need to be reinforced, modified or improved at the Promoter's expense.

6.5.3. All excavation support structures are to be designed by a competent person to withstand all external forces and to have adequate penetration below excavation level to resist heave and seepage of water into the excavation. The Engineer may require structural calculations.

All walings and struts shall be installed in a proper manner as the excavation proceeds. The tops of all temporary sheet piles shall be left above MAXIMUM canal water level to cater for flood flows and inundation.

6.5.4. Suitable buffers and fenders painted white shall be provided to guide vessels into the diversion.

6.5.5. The minimum acceptable navigable channel width is site specific and will be specified by the Engineer.

6.5.6. In proposals adopting the overlapping cofferdam method, the design needs to take into account such matters as boat manoeuvrability, landing stages for delay during one-way working and the proximity of other navigational restrictions such as locks, alignment, visibility etc.

6.5.7. Steel, earthenware, fibrous concrete and plastic pipes must have a 300 mm concrete minimum surround.

6.6. Construction - Overlapping Cofferdam

6.6.1. A record of the size and penetration of each pile in any permanent sheet piling and in any cofferdam is to be kept and provided to the Engineer.

6.6.2. In addition to the signing requirements referred to in the Bye-Laws, reflective chevron marking plates shall be affixed to clearly identify the extremities of the fender which is to be placed as protection around the cofferdam as shown on British Waterways standard drawings. The fender shall be painted white.

6.6.3. All signs should be erected and maintained in a secure and prominent position clearly visible to navigators without obstructing the towing path or navigation and they should be capable of withstanding vessel impact.

6.6.4. Where traffic levels or visibility demand one way working using signals or flags will be required.

6.6.5. Puddle clay should be from an approved source, should comply with the British Waterways Specification and should be worked and placed using agreed techniques to the satisfaction of the Engineer.

6.6.6. Back fill to canal banks etc. should be adequately compacted to the satisfaction of the Engineer.

6.6.7. The removal or cutting off of temporary piles is to be carried out using an agreed technique to the satisfaction of the Engineer, so as not to have an adverse effect on the watertightness of the canal.

6.7. Maintenance - Overlapping Cofferdam

6.7.1. In cases where it has been necessary to replant a hedge, it shall be protected from grazing stock and maintained until established.

7. SPECIFIC REQUIREMENTS FOR WATER ABSTRACTION & DISCHARGE

This section is applicable to canals and navigable rivers where British Waterways is riparian owner and those navigations identified in Statutory Instrument No 1195 *The Inland Waterways of the British Waterways Board Order 1965*. The requirements relating to navigation are applicable to other river navigations.

7.1. WATER DISCHARGE

7.1.1. Introduction

British Waterways is not a land drainage authority. Water levels in canals are maintained in dry spells using reservoirs, river abstractions, pumping from ground water sources and recirculatory pumping at locks ('back pumping'). Water levels are controlled in wet periods using overflow weirs and manually controlled sluices. Without these, the canal would overtop and breach its banks, causing damage to property and possible loss of life. When the canals were constructed, they were usually a closed system, isolated from the effects of storms. Therefore storm water discharges do not assist in dry periods and can cause severe difficulties in wet conditions.

British Waterways will use *Surface Water Discharge – Guidance in accepting new discharges* when reviewing proposals. Extracts from this document will be made available to Promoter's as necessary

British Waterways supports the principles of Sustainable Urban Drainage (SUDS) which should be followed. . Guidance is given in the CIRIA publication C523 *Sustainable Urban Drainage Systems – Best Practice Manual.*

7.1.2. Procedure

- the Promoter provides initial information using the Notification Form (Appendix 1) and the Checklist for Outline Pollution Risk and Hydrological Assessment (Appendix 2)
- British Waterways and the Promoter discuss commercial and contractual matters
- British Waterways carries out a preliminary Technical and Environmental Appraisal
- British Waterways carries out an Outline Pollution Risk Assessment, assessing pollution hazards, management controls and pollution risks
- British Waterways carries out an Outline Hydrological Assessment
- the Promoter carries out a Detailed Pollution Risk Assessment if Outline Assessment defines the need.
- the Promoter carries out a Detailed Hydrological Assessment if Outline Assessment defines the need.
- British Waterways determines if engineering works, such as weirs, are needed to accommodate discharge
- the hydrological and environmental aspects of engineering works are considered
- British Waterways assesses if the benefits of accepting the discharge outweigh the impacts

- a decision is made as to whether or not the proposal is to proceed further.
- the Promoter provides evidence of application for discharge consent from the Environment Agency or Scottish Environment Protection Agency
- British Waterways discusses with the Environment Agency or Scottish Environment Protection Agency the discharge consent conditions if consent is required
- if everything is in order and if the benefits of accepting the discharge outweigh the impacts proceed to Contract
- construct Works

7.1.3. **Feasibility And Design**

The only discharge, which will normally be considered, is uncontaminated surface water in small quantities at suitable locations, subject to the general principles defined above.

British Waterways is not obliged to accept sewage or trade effluent. Such flows will not normally be accepted due to concern over water quality and lack of dilution**,** unless treated to a standard acceptable to BW, and unless the treatment plant is operated and maintained to a standard acceptable to BW.

Pollution Risks from surface water discharges will be assessed by British Waterways using the Outline Pollution Risk Assessment system in Surface Water Discharge – Guidance in accepting new discharges

The effect of the system is that very high hazards (hazardous industry) will never be accepted. High hazards (general industry) will only be accepted if the company has the best level of management control. Even then, a detailed environmental assessment will be required. Medium hazards (commercial / light industrial) may be accepted with or without a detailed pollution risk assessment depending on the level of management control, and may be rejected if management control is poor. Low hazards (residential) will usually not be rejected on the grounds of pollution risk and will not normally need a detailed pollution risk assessment without the need for an environmental assessment.

Discharges into the Waterway may require consent from the Environment Agency or the Scottish Environment Protection Agency. The Promoter will be responsible for obtaining any necessary consent and providing proof to the Engineer that this has been done. It must not be presumed that Environment Agency consent confers British Waterways consent.

Calculations and plans will be required for the drainage network. The plans should define the pipe runs and illustrate the uses to which the drained areas are to be put and any other factors that may affect the quality of the surface run-off.

In order to determine whether or not the canal has sufficient capacity to accept the discharge, without risk of the canal overtopping, the peak discharge flow rate, which the outfall is capable of, must be calculated. The worst case must be determined. Full bore flow with manhole surcharge and rainfall return periods of up to 100 years must be considered. Hydrographs may be needed particularly when hydro-brakes are under consideration.

In some cases it may be necessary to mathematically model the affected canal pound, taking into account other inflows and outflows. Consideration should be given to flows bypassing the drainage network and entering the canal over land.

Once the calculated flow rate has been established additional canal overflow weirage and modification to lock by-washes may be required. It must be agreed at an early stage whether the weirs are to be procured by British Waterways or the Promoter and which party will maintain the weirs in the long term. It is usual that the weir is designed and built by the Promoter to an acceptable design and that British Waterways assumes long term responsibility for the structure. Joint discussions with the Environment Agency (Scottish Environment Protection Agency in Scotland) and other interested parties are needed.

Discharges are not usually permissible in short canal pounds between locks. Difficulties could result from the capacity of by-wash weirs, surcharging the pounds and dewatering for the maintenance of locks.

Discharges are not usually permissible directly above and below locks, adjacent to moving bridges and at mooring sites. Navigational difficulties would ensue as a result of the transverse flows.

In order to minimise navigational difficulties associated with transverse flows of water the discharge energy must be minimised in the discharge structure design or by storage. Discharge velocity generally must not exceed 0.3m/s measured at 90^0 to the direction of the navigable channel.

At locations where craft will be manœuvring at low speed this velocity of discharge will be reduced in proportion to the reduction in craft speed. The Engineer will specify the craft speed. A stilling basin is usually needed to comply with this requirement. In some cases physical or mathematical modelling may be necessary.

Scour protection may be needed.

Discharge structures should be designed to minimise the visual impact on the canal, to allow the quality of the discharge to be monitored and to prevent loss of water from the canal into the drainage system. The structure should be accessible in safety for maintenance and sampling. Where this is not possible, for instance on river navigations, a remote sampling point and a flap valve are needed.

Fendering and signing of structures may be necessary. In particular pumped discharges will need to be signed.

Discharge structures should be capable of carrying the loads imposed by the use of the towing path maintenance vehicles.

Towing-path levels should not be raised.

Pollution control measures such as trapped gullies, oil separators, silt traps, swales or detention ponds will be required where appropriate. Further information is given in the Pollution Risk Assessment System in *Surface Water Discharge – Guidance in accepting new discharges*

Where it is possible to do so at design stage a representative sample of the proposed water should be taken and analysed for appropriate parameters. The results should be supplied to the Engineer for consideration. In some cases an analysed sample of the water in the receiving canal will be required for the purpose of comparison.

The discharge of water to canals leads to the transfer of water in an open channel to waste weirs. In some instances the issues discussed below under 'Water Transfer' may be applicable.

7.1.4. Operation & Maintenance

There must be a long-term agreed maintenance regime for oil separators, silt traps, swales and other pollution control devices.

During operation, it may be necessary to require that water samples are taken at intervals and analysed. It may be necessary for British Waterways or its agents to inspect from time to time the area drained to the Waterway to ensure that the pollution risks remain acceptable. Alternatively, it may be acceptable for the inspection to be carried out by the discharger using a standard self-assessment procedure.

7.2. ABSTRACTIONS

7.2.1. Introduction

Abstraction is possible subject to the availability of water and to negotiating an acceptable charge. It may be appropriate to return a proportion of water where no contamination has been added subject to considerations of temperature.

The quality of water and the continuity of supply cannot be guaranteed. Information regarding typical water quality can be supplied. It may be necessary for maintenance and engineering purposes to de-water the canal. In such circumstances, it is usually possible to maintain continuity of water supply by over-pumping.

In the case of abstractions, negotiations may be carried out by the Estates Manager, the General Manager or the centrally base Water Sales Contracts Manager, as appropriate.

Abstractions in England and Wales will require a licence from the Environment Agency (Scottish Environment Protection Agency in Scotland). The Abstraction Licenses are obtained and held by British Waterways. There is a statutory process under the Water Resources Act 1991 involved in obtaining an Abstraction Licence. It is not therefore usually possible to abstract at short notice.

7.2.2. Feasibility and Design

Abstraction is not usually permissible from short canal pounds between locks, owing to the difficulty of maintaining levels.

Abstraction is not usually possible directly adjacent to locks, moving bridges and mooring sites owing to the navigational difficulties which would ensue.

Abstraction structures are normally required. The structures must have a facility to stop the abstraction flow and should have safe access for British Waterways staff at all times in order to cater for eventualities and emergencies. The design of the structure should facilitate de-watering for maintenance.

A safely accessible metering facility should be included.

The watertight lining to the canal will need to be appropriately modified to permit abstraction.

Scour protection may be needed.

In order to minimise navigational difficulties associated with transverse velocities the maximum velocity of the abstracted flow must not exceed 0.3 m/s measured at 90^0 to the direction of the navigable channel. Where craft are manoeuvring at low speed this velocity will be reduced in proportion to the reduction in craft speed. The craft speed will be specified by the Engineer.

Measures may be needed to ensure that fish are not sucked in. An Environment Agency document *Diversion and Entrapment of Fish at Water Intakes and Outfalls,* by Dr DJ Solomon, NRA R&D Report No 1, July 1992 is available.

Signing and fendering may be needed.

Abstraction structures should be capable of carrying the loads imposed by the use of the towing path by maintenance vehicles.

Towing-path levels should not be raised.

The sale of water from canals leads to the transfer of water in an open channel from feeders or other water sources to the abstraction point. In some instances the issues discussed below under 'Water Transfer' may be applicable.

7.2.3. Maintenance

Grilles may be needed to prevent debris entering the system. Debris removed from the grills should be disposed of promptly and not left on the canal side.

7.3. WATER TRANSFER

7.3.1. Introduction

Where canals or rivers are being used to transfer significant volumes of water from one point to another, from a discharge to a weir, or from a feeder to an abstraction point, special consideration is needed. The works summarised below may be necessary:

- raising of freeboard levels to a degree to be agreed with the engineer; considerations of the backwater curve indicate that there should be sufficient freeboard not only between the inlet to the canal and the outlet, but also beyond the outlet and in the other direction from the inlet.
- where freeboard levels are to be increased and the canal is carried on an embankment (i.e. proposed water level is above the surrounding land on one or both banks), consideration should be given to the impact, if any on the stability of the embankment.
- raising of bridges to give satisfactory clearances with the increased level associated with the hydraulic gradients; reduced headroom leads to serious dangers to boat users.
- widening and deepening areas of restricted cross-section in order that flow velocity does not lead to navigational difficulties.
- installing bank protection to prevent erosion associated with the flow.
- raising of existing puddle clay, clay trenches or other measures to counteract leakage and increased seepage.

Modification works will cause a significant environmental impact and will require careful consideration. The environmental impact will not be restricted to the immediate effect of the Works since the changes in velocity and level may cause long term environmental effects, both in the waterway and in inter-connected rivers, reservoirs, groundwaters, etc.. These will need to be assessed at the planning stage.

Consideration must be given to the consequences of interruption of the flow during for example Works of maintenance or construction.

8. SPECIFIC REQUIREMENTS FOR THE INSTALLATION OF SERVICES IN THE TOWING PATH

Each site will be considered on its own merits. In order to protect the integrity of the structure of the canal and its environment, the following general guide-lines will apply.

8.1 Feasibility:

8.1.1. A number of factors need to be considered when determining the most suitable depth and position for the trench. Such factors are likely to include the position of the waterway wall, existing hedges and trees, other plant and animal life (most commonly badgers and water voles) that may be affected, presence of invasive weeds such as Japanese Knotweed, structures, embankments, cuttings, canal lining (puddle clay or other), tie rods, the use of mooring spikes, surfacing, presence of contaminated land etc. Canal operations such as mooring points may also have an effect on the positioning of the trench.

8.1.2. Sufficient site surveys, geotechnical investigations and planning enquiries shall be undertaken to substantiate the proposed route and installation design.

8.1.3. The main environmental issues relate to disturbance or disposal of contaminated land, disturbance or damage to hedges, trees and wildlife, and spread of invasive weeds. Site surveys and desk studies will be needed to assess these issues to minimise environmental impact. Detailed guidance on these issues is available from British Waterways

8.2. **Design:**

8.2.1. Access points and manholes shall be arranged so as to avoid linear access along the towing path for future laying and maintenance operations.

8.2.2. Where the nature of the apparatus is such that if punctured or damaged by a mooring spike or similar injury to Waterway visitors or damage to canal structures could occur, it will be necessary for the apparatus to be suitably protected to prevent such damage.

8.2.3. Outline installation programmes and factors to be incorporated in the order and method of construction and reinstatement shall be agreed with the Engineer and incorporated in the Contract Specifications, prior to the Promoter inviting Tenders.

8.2.4. Where Works are to be of phased construction, 7 days notice shall be given of commencement of each individual length within that phase.

8.2.5. Localised arrangements may have to be made to accommodate previously agreed third party or British Waterways works. Fishing clubs and other similar organisations likely to be affected by the Works should be consulted and if necessary appropriate action should be taken to accommodate them.

8.2.6. The line and depth of the trench should take account of the environmental constraints identified in the survey work and desk studies so as to minimise environmental impact.

8.3. **Installation**

All works should be carried out in accordance with National Joint Utilities Group Guidelines (e.g. NJUG Publication No. 10 – *Planning, Installation and Maintenance of Utility Services in Proximity to Trees*), which contains guidance on how to avoid damage to tree roots, and can also be used to avoid damage to hedgerow roots.

8.3.1. Access to working areas shall only be at locations agreed with the Engineer.

8.3.2. Vehicular access along the towing path will only be permitted when agreed by the Engineer. Appropriately sized plant should then be used and passage along the towing path kept to a minimum. In the interests of safety the maximum speed limit on the towing path is 5 mph.

8.3.3. The Works must not obstruct the use of and access to landing points at locks, moveable bridges and other such operational structures. Where this cannot be achieved, alternative temporary facilities must be provided.

8.3.4. The use of floating plant is to be encouraged.

8.3.5. British Waterways offers no right of support to the apparatus.

8.3.6. If required by the Engineer, bank protection must be repaired or installed to the design life of the apparatus. A suitable land drainage system may be required to drain the towing path surface.

8.3.7. The width of the trench shall be the minimum practical to allow proper laying and compaction of the apparatus.

8.3.8. When digging within embankments and cuttings, the absolute minimum of disturbance must occur. Adequate erosion and sediment control measures to reduce impact of activities must be installed.

8.3.9. Tie bars and back anchors to bank protection systems must remain undisturbed. If this is not possible, suitable arrangements for their replacement must be agreed with the Engineer.

8.3.10. The existing puddle clay or other impermeable lining and water-bars must remain undisturbed. Where this is not possible, suitable arrangements for their reinstatement must be agreed with the Engineer.

8.3.11. Trenches shall be properly compacted with suitable backfill to minimise surface settlement and measures taken to prevent the creation of seepage paths for the canal water. Where water is detected in the trench the Engineer must be notified immediately. Backfilling must not proceed until the Engineer has been informed and visited the site.

8.3.12. Puddle clay water bars must be provided at 100m intervals and at positions specified by the Engineer. In some locations, such as embankments, it may be necessary to backfill the trench along its length with puddle clay.

8.3.13. Marker tape placed above the apparatus is required. A trace wire embedded within the tape may be required to allow future detection of the apparatus. Marker slabs may also be required. Above ground markers may be required at suitable locations.

8.3.14. All materials shall be stored in such a way as to avoid overloading the canal structure, disrupting users, to minimise damage to towing path vegetation and to deter vandals. Pollution should be avoided by following the advice in the Environment Agency Pollution Prevention Guidance Note No 6 *Working at Construction and Demolition Sites*.

8.3.15. If ducts are to be dewatered, care should be taken in the disposal of the water as it can often be contaminated with silt, oil, or other substances. Discharge to the waterway or other surface waters is not favoured because of the pollution risks. No discharge to the waterway should occur without the permission of the BW Engineer. Guidance is given in the Environment Agency Pollution Prevention Guidance Note No. 20 *Dewatering of underground ducts and chambers*.

8.3.16. All surplus excavation material shall be removed from site unless prior consent has been given by the Engineer for on-site disposal or other use. Waste management legislation shall be complied with, including the need to take precautions to avoid the spread of Japanese Knotweed. Guidance on the latter is given in the Environment Agency leaflet *Guidance for control of invasive plants near watercourses.*

8.4. **Towing Path Restoration:**

8.4.1. Duct laying should be concurrent with excavation and backfilling, so as to minimise the length of open excavation. Trenches in vulnerable locations shall be backfilled overnight.

8.4.2. Interim towing path restoration to a standard acceptable to the Engineer shall be completed within two weeks of initial excavation of the trench. Interim restoration should be signed as such to inform canal visitors.

8.4.3. Where a stoned path or better is damaged by the Works, an interim restoration of a path 1m x 75 mm thick, in well graded and compacted stone, to an agreed specification will be acceptable.

8.4.4. Previously unsurfaced paths damaged by the Works shall be restored to a condition that allows walking in 'country shoes'.

8.4.5. Opportunities should be taken to enhance access for people with disabilities where possible through appropriate surfacing, reduction in crossfall, etc.

8.4.6. Damage to vegetation should be minimised. Where restoration is necessary, native seed or plants of local provenance should be used. Species which reflect the local flora should be selected.

8.4.7. Final restoration shall be completed as soon as possible after installation and no later than three months from initial excavation. This may mean that reseeding or replanting may have to be put off until the growing season (March to October inclusive). Reinstatement works are to be undertaken carefully, in a manner agreed with the Engineer and are to be compatible with the age and style of the original or surrounding materials.

8.4.8. The full width of route disturbed by the Works is to be reinstated to a standard acceptable to the Engineer.

8.4.9. Brick paving, Breedon gravel or other high quality surfacing shall be reconstructed to the agreed specification over the full width of the path or lock/bridge landing disturbed by the Works. Recycled aggregates should be used, where possible for buried construction layers.

8.4.10. Unless otherwise specified by the Engineer, reinstatement shall be generally to the standards outlined in the Highway and Utilities Joint Committee Specification.

8.4.11. Manholes must be kept to a minimum size and be of an appropriate design aesthetically. The compaction of backfill around manholes is important. Manhole covers should be permanent, recessed and lockable. They should be of sufficient strength to withstand all anticipated traffic loading.

8.4.12. Buried manhole covers are preferred, particularly where access for all is possible. Marker posts are required. The Promoter will be required to replace any damaged or missing posts throughout the life span of the apparatus.

8.5. Installation Completion

8.5.1. British Waterways will respond to the issue of an Inspection notice confirming final restoration, within 21 days for each phase of the installation.

8.5.2. As built drawings are required by the Engineer. The position of the trench must be indicated at 100m intervals and related to hard features including the waterway wall. Drawings must include the location of water bars and any other features installed or encountered as part of the Works.

8.5.3. Where hedgerows or trees are reinstated with new planting the Promoter may be required to maintain the new planting for a period of 12 months, replacing any dead or dying stock as required.

8.5.4. Upon completion of the Works, details of the safety procedures that should be followed in connection with the installed apparatus should be forwarded to the Engineer. Details of long term emergency contacts are required by the Engineer.

9. SPECIFIC REQUIREMENTS FOR MOORING BASINS AND LAY-BYES

9.1. Introduction

9.1.1. British Waterways generally welcomes the installation of moorings and marinas in appropriate locations. However there is a presumption against linear moorings, the construction of marinas or lay-by moorings in short pounds, where there are already difficulties in maintaining water levels, near locks, or on a bend. In areas already experiencing operational difficulties due to high boat concentrations, the consent for new proposals may be withheld. In such locations, the new marina may be required to accommodate craft currently moored adjacent to the banks of the navigation. Where accommodation works are necessary to support the proposal, including the solution to consequential operational problems, these will be at the expense of the Promoter. Generally basins will not be permitted where there is a need to lock down from the canal.

9.1.2. A Contract will be required to authorise the connection of a basin to the Waterway, or to authorises moorings alongside the navigation. In the case of a lay-by mooring, effectively a widening of the canal, the transfer of the freehold of the lay-bye to British Waterways is presumed.

9.1.3. It may be possible for British Waterways to provide a service to obtain Planning Permission for, design and to have built a mooring basin or lay-by.

9.1.4. The proposal for any mooring basin, mooring or lay-bye will be considered in two distinct stages:-

- feasibility during which the practicality and acceptability of the proposition will be considered and discussed.
- design and construction wherein all matters relating to the design, detailing, construction and operation will be the subject of a Submission.

9.2. Feasibility

9.2.1. In order to assess the impact of the proposals on the adjoining navigations Waterways may require specific information. This may include:-

- numbers, dimensions, type (i.e. private, trip boats, hire boats, day boats, commercial carriers etc.) and use of craft
- details of drinking water supply, refuse and sewerage disposal for craft
- details of vehicle parking and access
- information on boat sales and repair, fuelling, chandlery and restaurants
- details of measures that are intended to protect water quality and to contain pollution generated from within the basin and from associated land-based facilities that may drain into the basin
- access for all, including those with disabilities

9.2.2. It will normally be necessary to obtain Planning Permission for such schemes, a written environmental statement is usually necessary, as well as written confirmation from British Waterways that the proposals are acceptable in principle. Developments in the flood plain are not normally permitted unless they are essential infrastructure, and are likely to be opposed by the Environment Agency (Scottish Environment Protection Agency in Scotland) as statutory consultee. Preliminary consultations with the Environment Agency are recommended to avoid delays. Land Drainage Consent may also be required by the Environment Agency for works within 8 m of a designated Main River.

9.2.3. Certain sizes of mooring basins may require a formal Environmental Impact Assessment under planning regulations. Anything over 1,000 m2 of waterspace may be covered at the discretion of the local planning authority.

9.2.4. British Waterways will consider the effect on current and future traffic boat traffic (including its consequential impact on the waterway environment), navigation safety, water supply, the type of moorings proposed, the provision of supporting facilities and environmental effects. A water resource study, to determine if the navigation can support the generated traffic, may be called for. The environmental impact of additional traffic resulting from the development will depend on existing levels of boat traffic and the extent to which they will increase. Waterways with low levels of traffic are often of high ecological value, with some designated as SSSIs. In these cases English Nature (or Countryside Council for Wales or Scottish Natural Heritage) will need to be consulted.

9.2.5. In the case of proposals from riparian owners on river navigations, British Waterways consent as the Statutorily designated Navigation Authority must be obtained. British Waterways may have statutory rights, which it may be necessary to preserve or accommodate.

9.2.6. The Promoter should, during early consultation stages, submit 6 copies of a Preliminary General Arrangement drawing detailing the proposed configuration of the moorings and a Site Location Plan. Both drawings should be of sufficient scale and area to enable the site and proposals to be clearly identifiable. A copy of the General Arrangement Drawing will be returned to the Promoter together with a schedule of information that is required for the Submission together with any initial comments. All levels shown on the General Arrangement shall be to Ordnance Datum and must show the water levels in the navigation. All land ownership encompassed by the proposals, together with those adjoining, must be shown, along with the layout of the various facilities.

9.2.7. Ground investigations should include the following information where the proposal connects to or interferes with the impermeable lining of an artificial cut or canalised navigation:-

- location and depth of all boreholes and trial pits.
- full log of boreholes and pits including description and classification of soils and ground water levels.
- location and depth of samples.
- an interpreted ground model with quantitative information on characteristics such as plasticity index, permeability (horizontal and vertical), classification by particle size distribution, angle of friction, cohesion and dispersivity index.
- ground levels not only to Ordnance Datum but also relative to normal water level in the canal and, where appropriate, levels of flood defences, maximum flood, mean low water of spring and neap tides and mean high water of spring and neap tides.
- quantitative information on contaminated land and ground water, where applicable. the engineer may require water quality monitoring during construction and subsequently during operation.

9.2.8. The site investigation is to be carried out in accordance with BS 5930 (1999) and testing to BS 1377 (1990). British Waterways is particularly concerned that the integrity and watertightness of the canal are not compromised For this reason, the required information should be obtained by a soils survey and site investigation specialist. The continuity of the bed clay or other lining in the marina or lay-by with that in the canal is of extreme importance. The main canal bed in the area of the junction must be profiled in order that the junction can be designed to provide sufficient depth for navigation and continuity of the lining.

9.2.9. The Promoter should present the results of the investigations in the form of a report which should be submitted to the Engineer. The report should contain a description of the ground model, highlighting any geotechnical hazards and including a geotechnical risk register. The Engineer will then advise on the need for puddle clay or other impermeable barrier within the mooring area, together with any other constructional requirements. Thereafter the Submission should follow the requirements and conditions of the Code of Practice for Works affecting British Waterways

9.2.10. A basin, which contains more than 25000 m^3 water and is raised above the level of the surrounding land may be a 'Large Raised Reservoir' under the Reservoirs Act 1975 and will need to be designed, constructed, inspected and supervised by members of the appropriate Panels.

9.2.11. Consideration must be given to the nature of land being used to create the moorings. Areas such as boggy or scrubby low-lying land adjacent to waterways are often of significant value for wildlife, and could contain protected species such as Great Crested Newts, Water Voles etc. Such areas should be avoided or new developments designed so as to retain a significant portion of the area of value, or to include other adequate mitigation measures.

9.3. Design & Construction

9.3.1. In the case of a mooring basin / marina with a connection to an artificial cut the following requirements will apply:-

- the basin must be sealed, except in impermeable ground, with a durable membrane to ensure that the water supply to the navigation is not adversely affected by leakage into the surrounding strata; the method of sealing will be of great importance and will be considered in conjunction with proposed construction methods and future maintenance, including dredging; if the adjacent or underlying land is contaminated, the seal must also prevent contamination entering the waterway.
- uplift should be considered for lined basins in areas of high or fluctuating groundwater level
- where contamination is considered to be a risk, the stilling test should be used as an opportunity to test for leaching into the basin.
- on completion of the construction of the basin and before connection to the navigation, the Promoter will be required to fill the basin with water up to the navigation level; a stilling test will then be carried out; the basin will be isolated from the canal by double stop planks and the space between the planks will be pumped out; all pumps, syphons etc. must then be removed and over a period of 28 days thereafter, or for so long as the Engineer deems necessary, the loss of water level in the basin from all sources, including evaporation, will be monitored to ensure that it is not excessive.
- the basin should be separated from the main navigation by an undisturbed berm that is lined and armoured as appropriate in order that the entrance cannot be by-passed by water.
- the entrance to the basin should generally be no wider than the standard lock gauge of the navigation unless manoeuvring of boats requires it.
- the entrance to the basin should be constructed to protect the integrity of the canal and should form an impermeable seal; a reinforced concrete invert slab is required at the entrance, together with two sets of stop planks and associated grooves and cills; for the further protection of the canal, the outer and inner toes of the entrance slab shall be piled to prevent undermining of the slab by scouring; the stop planks must be stored and maintained ready for use adjacent to the entrance at all times; the walls of the entrance should be steel piling, mass or reinforced concrete, masonry or brickwork.
- it is a requirement of the Bye-Laws that craft entering or leaving a marina, or turning, should not impede or endanger craft in the main channel; to satisfy this, particular attention will be given to proposals for the entrance to ensure the design is such that the sight lines are acceptable and that they are not obscured by craft moored on that frontage; there must also be sufficient waterspace for craft to execute the turn or to hold until the channel is clear for them to proceed.

- where towing path continuity, rights of way or other protected rights of access are to be maintained over an entrance to any mooring basin, the Promoter shall be required to construct, and maintain, a bridge over that entrance capable of carrying the traffic needing to use that route (including disabled people where appropriate); navigation clearances under the bridge are to be provided to enable craft of maximum dimensions plus a clearance to pass through; the bridge must be aesthetically appropriate to the Waterway environment.
- in order to prevent scour of the towing path or bank opposite the entrance by the wash of craft turning into or out of the marina entrance the Engineer may require that the Promoter undertakes or pay for appropriate protection works to that bank
- the method of bank protection used should take account of ecological, aesthetic and heritage issues – see above
- any future changes requiring an extension of the basin or alterations to the seal, after the initial consent, must be the subject of re-application and consultation

9.3.2. In the case of marinas on river navigations or natural parts of canals the above principles will be deemed to apply except for those matters relating to the need to seal the basin. If, however, the navigation can be drained for maintenance or by failure of any embankment, it will be the responsibility of the Promoter to decide whether or not to protect the craft in the basin.

9.3.3. Where the proposal relates to a canal or river for which the British Waterways has responsibility as Navigation Authority, the Consent of the British Waterways will be required for all parts of the proposal that are considered to affect navigation safety.

9.3.4. Lay-bye moorings are better suited to natural watercourses rather than canals. They are required to contain the maximum beam or length of craft, together with any staging, pontoons, mooring piles and buoys. In the case of an artificial cut or a lined watercourse the lay-bye must be so constructed that the seal or lining is extended over the bed and up the banks of the new area and connected to the existing impermeable lining. This may only be satisfactorily achieved by dewatering or behind a cofferdam. Difficulties are often encountered in determining the extent and condition of the existing lining.

9.3.5. All structures must be protected where necessary by fendering designed and installed to resist the impact of moving craft, vertical movements of water level due to flooding or tides and to protect the hulls and superstructures of craft from damage.

10. SPECIFIC REQUIREMENTS FOR SITE INVESTIGATIONS

Site investigation is a requirement for the majority of works covered by this code, and the information arising forms a key part of the assessment by British Waterways of the overall submission. It is therefore important that the level and quality of information is consistent with the complexity of the proposed works. The site investigation should be sufficient to reduce the risks associated with unforeseen ground conditions to a tolerable level.

In line with industry practice, the site investigation should be under the overall supervision of a Ground Specialist (ICE 1993), who should have appropriate experience of the type of development proposed. The investigation must be carried out to the standards defined in BS 5930 (1999) as a minimum: where a departure from the standard is used, justification must be provided. Soil testing must be carried out to BS 1377 (1990), by a UKAS accredited laboratory.

Attention is drawn to the fact that, for the purposes of the Construction, Design and Management Regulations (1994), site investigation is considered to be a construction activity. Compliance with the regulations must be ensured by the promoter.

The Ground Model

The overriding objective of the investigation is to produce a ground model, against which predictions may be made regarding the ground response to the proposed works. The ground model requires interpretation of the geology, ground conditions including groundwater and other factors (including existing structures), by a suitably qualified and experienced person; normally this will be a geotechnical engineer or engineering geologist.

The ground model should be described clearly using plans, cross-sections, block diagrams and other sketches as appropriate. Areas of assumption or interpolation should be clearly identified.

Geotechnical Desk Study

The site investigation should include a desk study phase, which should include a walk-over survey of the site. It is often found that reference to historic maps provides useful information on the history of development of a waterway site, particularly in more developed areas.

The desk study should include:

- an initial ground model
- recommendations for further investigation as appropriate, to further define the ground model
- a preliminary geotechnical hazard list and risk register, which should be updated throughout the later phases of investigation.

Ground Investigation

Prior to commencing the ground investigation, all borehole/ trial hole positions and accesses should be agreed with the Engineer, and checked for positive identification of any services or other underground structures. A check should also be made for recorded archaeological sites, and the listed status of any structures which may be affected, together with any land designation (such as SSSI status). Details of the proposed investigation, together with any environmental or heritage impacts, must be included in the environmental appraisal for the site (see section 2).

Care should be taken not to disturb wildlife when carrying out any intrusive investigations (boreholes, trial pits, etc). Of the wildlife most likely to be encountered, badgers (and their setts), nesting birds, bats, water voles and all reptiles require special attention as they are all legally protected.

No borehole shall be drilled or trial pit excavated within five metres of the water's edge or within the water channel without the written permission of the Engineer. Normally, this would only be necessary where it is required to determine the composition and properties of the bed/ lining material, to assess whether the lining

extends behind the bank protection, or to locate services or other buried structures.

Waterway walls are not structural retaining walls, merely erosion protection. They are often up to two hundred years old. Plant should be lightweight only and physically restrained from approaching the edge of the canal. A condition survey and risk assessment will be required.

The impermeable lining to the canal should be identified, located and avoided where at all possible. However, if it will be necessary to affect the navigation channel, within the existing Waterway width, for temporary or permanent works, then bed profiling for a sufficient distance either side of the Works should be carried out. In such cases where it is necessary to carry out bed profiles, and/or identify bed materials, impermeable linings etc., any investigations must be agreed in detail with the Engineer in order to minimise the risk of damage to the canal. The Engineer may reserve the right to carry out these investigations using his own contractor at the Promoter's expense.

Other constraints which must be observed are:

- At no time shall the Waterway or towing-path be blocked. Signage and suitable fencing or other barriers must be used to segregate the public from the working area.
- No trial pits are to be excavated on embankment slopes below the level of the canal or within five metres of the toe of such embankments.
- No water is to be pumped into or out of the canal.
- No borehole or trial pit spoil or grout shall be allowed to enter the canal and all such arisings shall be removed from British Waterways' property in compliance with waste management legislation.
- Boreholes are to be sealed and backfilled with cement-bentonite grout of an agreed specification. Where alternative backfilling is required (for example for a particular installation), this is to be by prior agreement.
- Trial pits are to be carefully backfilled and adequately compacted in layers.
- Any variations from these constraints require the written agreement of the Engineer.

Reinstatement

All access roads used, and fences and hedges disturbed during the investigation are to be fully reinstated to the Engineer's satisfaction. The Engineer may reserve the right to carry out such work using his own contractor at the Promoter's expense.

Where it is necessary to leave apparatus such as piezometers or survey stations on British Waterways' land, the design of the installations, including details of covers etc, must be acceptable to the Engineer. A Commercial Agreement may also be required**.**

Provision of information

Relevant logs, test data and other field information must be submitted. The preferred format is paper, backed up by electronic (e.g. .pdf format) copies, as well as AGS data (current version). Interpretative reports should be provided as a paper copy, together with electronic (e.g. Word or .pdf) version.

All exploratory holes must be accompanied by a 12-figure national grid reference, as well as a level to Ordnance Datum. Where it is not practical to provide levels to OD (for example where no benchmarks are present locally), then it may be acceptable to

provide a relative level to an agreed datum (not water level), with a suitable witness drawing of any temporary benchmark used.

References

ICE (1993) *Site Investigation in Construction Series 1 to 4*, ICE Site Investigation Steering Group, Thomas Telford, London.

11. SPECIFIC REQUIREMENTS FOR DEMOLITION

see Sustainable Deconstruction

11.1. All work shall be carried out in accordance with BS 6187 Demolition, also in accordance with the Health and Safety Executive publications listed in the legislation and the COSHH regulations.

11.2. A full CDM statement will be agreed with the Engineer.

11.3. Demolitions adjacent to and over the canal shall be screened to ensure no detritus arising shall enter the canal or British Waterways' Property. Any debris, which does fall in, must be removed straight away. The canal bed shall be surveyed by dipping / diving / use of chains to locate isolated items etc. before and after the Works have been carried out and any remaining materials that have entered the waterway shall be removed.

11.4. A contaminated land assessment may be needed before work commences to assess the risks of contaminants leaching into the canal. The design and operation of the demolition works will need to take account of any risks identified. Guidance is given in the Environment Agency's Prevention of Pollution Guidance Note No 6, *Working at construction and demolition sites*

11.5. The passage of boats on the navigation shall be maintained unless otherwise agreed.

11.6. The use of explosives shall comply with the Home Office Regulations and shall only be permitted after full consultation with all relevant authorities including the Engineer.

11.7. British Waterways own and maintain many old structures, which could be adversely affected by excessive vibrations. Vibration predictions shall therefore be required, for approval by the Engineer, prior to the Works commencing. Agreement with the Engineer will need to be reached on acceptable frequency limits and the predicted Peak Particle Velocities. Monitoring during demolition shall be required to check these predictions. If damage to British Waterways' structures does occur the Promoter shall be responsible for full immediate reinstatement to the Engineer's satisfaction. Consideration also needs to be given to nearby residents and the potential disturbance vibrations may have on wildlife.

11.8. Extreme caution needs to be taken when the removal of cellars is included in the clearance works. These are normally below water level and may well be retaining ground water, which is linked to the Waterway.

11.9. Historic structures alongside waterways, whether designated or not, may contain valuable archaeological information, or heritage features that should be preserved, rescued or recovered for future use. British Waterways should be allowed to assess and record the contents of the structure before demolition and to make first offer for any part of the structure which is if of value.

11.10. Buildings, especially when derelict, can be home to bats, birds and other wildlife, and consideration should be given to the need to protect them during the works. Bats and wild birds and their nests are legally protected and surveys to establish their presence are strongly recommended to avoid delays to the works.

12. SPECIFIC REQUIREMENTS FOR MAINTENANCE

12.1. A Contract for access on to British Waterways' property, including airspace may be needed, unless there are agreements already in force or the Promoter has statutory powers.

12.2. The Method Statement, Safety Statement and Temporary Works Drawings must particularly address the following:

- safety and convenience for boats and pedestrians - consider working at night, in the winter or from floating platforms.
- if there are headroom constraints, which require the job to be done in two parts, relative to the waterway, the location of the channel must be determined, the temporary works designed accordingly and dredging carried out if necessary
- exclusion of deleterious matter from the waterway particularly:
- lead based paint
- chemicals and paint residues from graffiti removal
- water & concrete from water jetting
- grit from grit blasting (N.B. copper slag and silicon grit must not be used) - consider the use of grit blasting units with the waste removed immediately by suction to sealed containers.
- fendering
- vandalism
- scaffolding
- tubes must not project into the navigation / towing path airspace and must be cut off and capped
- scaffolding should not if possible rest on the canal bed; if this is unavoidable, large recoverable spreader plates must be used and settlement must be allowed for
- consider boat impact loads
- fixing bolts should face away from the navigation
- it may be necessary to board out soffits etc. externally, where clearances are tight, for safety reasons
- access
- signs and lighting in accordance with the bye laws
- stability of floating platforms
- if longitudinal fabric dams are envisaged, fendering and the effect of boat propellers must be considered
- impacts of timing of works on wildlife that may be affected – for instance breeding or hibernation periods for animals and flowering seasons for plants

- impacts on adjacent valuable waterway habitats such as long grassland, reed-fringe, hedgerows etc

12.3. Agreed methods of working must be communicated to sub-contractors

12.4. The Promoter should check with the Environment Agency (Scottish Environment Protection Agency in Scotland) to see if consent is needed

13. SPECIFIC REQUIREMENTS FOR DIVING OPERATIONS

13.1. All diving operations in waterways under British Waterways control must be in accordance with the Diving at Work Regulations 1997 and the Approved Code of Practice for Commercial diving projects Inland/Inshore.

13.2. No individual or organisation, other than the Police in support of an ongoing search or investigation, may conduct diving operations in waterways under the control of British Waterways without first seeking prior consent to do so.

13.3. Consent should normally take the form of an exchange of documents or letters that incorporates the issue of the hazard information as a drawing or summary and in some case may specify actions the promoter is required to take to meet the requirements of British Waterways.

13.4. Once consent has been granted to conduct diving operations and any separate arrangements for isolation of plant or equipment are completed, the responsibility for authorising or controlling the diving operation remains with the promoter or contractor, not with British Waterways.

13.5. A validated copy of the correspondence confirming consent to conduct diving operations must be available at the proposed worksite

13.6. British Waterways cannot accept any responsibility for providing hazard information to any diving activity that occurs without its prior knowledge.

13.7. British Waterways will request that any diving operation be ceased at the earliest opportunity - without compromising the safety of the diver or support team - where no prior knowledge of the activity has been provided or no documented proof of consent exists at the dive site.

14. SPECIFIC REQUIREMENTS FOR HYDROPOWER AND LEISURE FACILITIES REQUIRING WATER ABSTRACTION

This section is applicable to navigable rivers where British Waterways is riparian owner and those navigation's identified in Statutory Instrument No 1195 *The Inland Waterways of the British Waterways Board Order 1965,* and to other river navigation's leased to or managed by British Waterways at the time the scheme is proposed.

14.1. Power Generation by Hydropower

14.1.1. Introduction

British Waterways strongly supports the principle of generation of electricity from renewable sources . However their installation must not cause restrictions in the use of the navigation by craft, or affect the operation and maintenance of other structures owned or managed by British Waterways.

14.1.2. Procedure

- the Promoter provides initial information using the Notification Form (Appendix 1), and submits a Costs Undertaking (Appendix 4) for the initial feasibility study stage
- the Promoter supplies Outline Assessment, indicating proposed abstraction through hydropower plant, affect on water levels immediately above the weir, estimated length of backwater curve due to proposal, river depth survey over backwater length, schedule of mooring points and other structures affected
- British Waterways determines if engineering works, such as weir crest raising, flood relief sluices, alterations to flood locks, additional one off and routine dredging etc, will be required to mitigate the effects of the installation
- British Waterways and the Promoter discuss Commercial and Contractual matters
- the Promoter carries out a Detailed Hydrological Assessment if Outline Assessment defines the need
- the hydrological and environmental aspects of engineering works are considered
- British Waterways assesses if the benefits of accepting the works required to structures and the navigation, and the restriction of water levels during the cruising season to minimum levels are likely to be sufficiently compensated by the Commercial Agreement and the benefits to the environment through reduction of greenhouse gasses
- a decision is then made as to whether or not the proposal is to proceed further.
- the Promoter provides evidence of application for Abstraction and discharge consent from the Environment Agency or Scottish Environment Protection Agency; if applicable an Impounding Licence may also be required for weir raising works

- British Waterways discusses with the Environment Agency or Scottish Environment Protection Agency the Abstraction and Discharge consent conditions, and the Impounding Licence if consent is required
- if everything is in order and if the benefits of accepting the proposal outweigh the impacts proceed to Contract
- the Promoter provides Risk Assessments and Method Statements for Works affecting the navigation
- construct Works
- maintain Works for duration of agreement and consents
- remove or seal up and return weir to pre-works level unless a permanent Impounding Consent is in place.

14.1.3. Feasibility And Design

The feasibility study will have to demonstrate the loss of water level at the weir due to the proposed abstraction of the hydropower plant, the extent of the backwater curve where river levels are affected. The changes in flow down the river channel will need to be assessed by surveying the full bed profile of the river over the affected length to determine whether sections will still be navigable due to lack of depth or races forming. (It must be understood that if river levels are lower due to passing most of the river flow through a hydropower plant instead of over a weir, then larger volumes of water than before must pass through a smaller cross-section in the river channel, and this can cause serious problems to craft navigating the river)

British Waterways is not obliged to accept a lowering of water levels as although craft are often affected for short periods in the summer when river flows are insufficient to supply adequate navigable depth, this is accepted by the skippers as purely due to adverse weather conditions. A hydropower installation is capable of holding river level at below what would be seen as drought levels for most of the cruising season.

Abstractions from above the weir and discharges below it will require consent from the Environment Agency or the Scottish Environment Protection Agency. The Promoter will be responsible for obtaining any necessary consent and providing proof to the Engineer that this has been done. It must not be presumed that Environment Agency consent confers British Waterways consent.

Works may be required to lift water levels back to acceptable levels defined by British Waterways, and these will have to be designed by the Promoter. Should this require raising of the weir an Impounding Licence may be required from the Environment Agency or the Scottish Environment Protection Agency, and if so, the Promoter will be responsible for obtaining the necessary consent and providing proof to the Engineer that this has been done. Any such raising works must be designed to be easily reversible.

If the weir crest cannot be raised sufficiently, or at all, due to increased flooding risk, it may be possible to mitigate the loss of water depth by appropriate initial and later maintenance dredging at the Promoter's expense. Should funding for later maintenance dredging be unavailable when required, the hydropower plant must be restricted in abstraction or closed down, until the required dredging is completed.

The nature of the way the hydropower station starts up and shuts down must be considered, to avoid rapid changes in water level. Ideally the installation should be designed to maintain constant water levels, rather than maximum generation with periods of shut down whilst levels recover before the plant restarts again working at maximum capacity.

Abstractions should ideally be protected by any existing weir navigation protection boom. Where the abstraction is upstream of the boom consideration should be given to either re-locating the boom, or installing additional protection to the inlet structure. The structure must be designed such that craft in the navigation channel passing the inlet do not experience flows towards the inlet greater than 0.3 metres per second at 90^0 to the navigation

If the discharge outlet is adjacent to the navigation channel, in order to minimise navigational difficulties associated with transverse flows of water the discharge energy must be minimised in the discharge structure design. The structure must be designed such that craft in the navigation channel passing the outlet do not experience flows away from the outlet greater than 0.3 metres per second at 90^0 to the navigation.

At locations where craft will be manoeuvring at low speed this velocity of abstraction and discharge will be reduced in proportion to the reduction in craft speed. The Engineer will specify the craft speed. A stilling basin may be needed to comply with this requirement.

In all cases where craft may be affected, mathematical modelling will be required to indicate flow paths at various river flows, with and without the power plant in operation. In some cases physical modelling may be necessary, and if experience after commissioning implies the modelling to have been incorrect the actual flows on site will have to be determined at the Promoters expense. Should the actual flows prove to be adversely, and significantly different to those predicted the plant must be restricted in capacity or closed down, until appropriate modifications are implemented and shown to be acceptable.

Scour protection may be needed, and any existing fish pass structures may have to blocked off and replaced with a new structure adjacent to the power plant, as the noise will attract the fish. Any such blocking off shall be designed to be easily reversible. The installation must be designed to minimise death and injury to fish stocks in the river.

Hydropower structures should be designed to minimise the visual impact on the canal, and they should be as quiet in operation as possible, with noise shields installed where residential properties or craft are nearby. The structure should be safely accessible for maintenance and access over or through the structure to the weir by British Waterways and the emergency services.

The Promoter must supply a drawing and method statement detailing the de-commissioning phase of the installation. This can be complete removal and reinstatement of the riverbanks, abutment shoulder, fish pass, etc, or sealing up and back filling of underground elements and removal of above ground structures. Sufficient detail is required to enable British Waterways to carry out this work in the event of the Promoter or his successor's being unavailable or financially unable to carry out this phase of the works.

14.1.4. Operation & Maintenance

It is unlikely that British Waterways will accept operating structures owned by others, installed on or in existing weir structures, such as motorised control of existing sluices, adjustable crest etc due to the difficulty of determining future maintenance responsibilities and assignment of risk.

Should works be essential to allow the scheme to be progressed, such as a weir crest raising, sealing up of fish pass etc, this will be carried out by British Waterways at the Promoter's cost. A charge will be made for the additional maintenance costs whilst the plant is in commission. The additional removal of the works at the end of the agreement will also be the Promoter's responsibility.

Following completion of such works British Waterways will own them, and will maintain them for the length of the agreement, removing and unsealing them on closure of the hydropower station, if required by the Environment Agency.

It is essential that arrangements are in place to allow British Waterways to access their weir structure for maintenance and inspection. Should security fencing be required to protect the hydropower station and this prevents access to the weir, British Waterways must be provided with a key.

Principal and Special Inspections of the weir may require it to be dewatered, and this would normally be done by localised stanking off, or by lowering of the river level via sluices or other draw-off structures controlled by British Waterways. If possible arrangements should be in place between British Waterways and the Promoter such that in suitable weather conditions the power plant can be used to de-water the weir to allow quicker and less disruptive access. The Promoter must allow within his business plan for interruptions in power generation due to inspection works and any future maintenance works to the weir by British Waterways.

Grilles may be needed to prevent debris entering the installation. Debris removed from the grills should be disposed of promptly at the Promoters expense and not left on the canal side. It will not be acceptable to place debris removed from the grill back into the water either upstream or downstream of the works

14.2. LEISURE FACILITIES REQUIRING WATER ABSTRACTION

14.2.1. Introduction

Leisure facilities relying on abstraction of river water are acceptable in principal to British Waterways, as long as the principles in section 14.1 for hydropower installations are complied with, together with the items below, and the benefits outweigh the impacts of the scheme. These commonly include canoe slalom and white water rafting courses, and have a very similar affect on the Navigation to hydropower generation schemes.

The quality of water and the continuity of supply cannot be guaranteed. Information regarding typical water quality can be supplied. It may be that the water quality at a location rules out its use for such leisure purposes

Where such facilities are built and they require canoes, rafts etc to be returned to the head of the facility to re-enter the course, suitable portage routes must be built that do not conflict with other users of the waterway. It is unlikely to be acceptable to use the towpath or to paddle such craft back through a lock.

This type of facility must have a control structure capable of regulating flows down the course, and of closing it down completely when required, Flows shall be stopped or left at minimal levels when the facility is not in use or water supplies are restricted by weather conditions.

At all times the Navigation will have priority in use of available water and the minimum river flows and upstream water level will be set by British Waterways, below which the facility may not be operated. A graph of maximum abstractions against available river flow will also be agreed with the Promoter, together with rates of change of abstraction to minimise the adverse effects on the Navigation.

APPENDIX 1 - NOTIFICATION FORM

(To be completed and returned to the local Office of British Waterways)

Functional Location (for British Waterways use):.....

Scheme Title

Person or Company Procuring the Works (The Promoter):

Company Name and Contacts:

Address:

Post Code: Fax: Phone

Agents of Promoter: Provide full details of all Agents and the scope of their commissions

(i.e. Consulting Engineer, Design & Build Contractor, Architect, etc.)

Grid Reference Location, Description, Scope and Cost of Works affecting the Waterway:

Attach Site Plan:

Proposed Commencement and Duration of Works:

Existing Agreements: (provide details of any agreements the Promoter has with British Waterways in relation to this site, or these Works).

Statutory Powers: (Provide Statutes under which the Promoter is able to serve notice of Works).

Other Approvals Sought \ Obtained: (Provide details\references to Party Wall Act Notices, Planning Applications, Discharge Licences, Land Drainage Consents, etc.).

Impacts on British Waterways: Provide details of the effects of the proposals on the Waterway. Please provide further details if applicable.	Yes/No
Do the works involve a new bridge? Is it road, rail or footbridge? Are difficulties with clearances envisaged? Is it possible to improve or create towing path accesses from the road? Is a striking modern design or one reflecting the canal environment envisaged? Do the Works involve a service crossing? Is any overhead electrical or telecommunication apparatus proposed? Are trenchless techniques envisaged? Is a permanent surface water discharge proposed? If so compete Appendix 2. Are services to be laid beneath the towing path? Do the Works include new or re-opened mooring basins etc? Is demolition adjacent to the Waterway necessary? Is there any demolition over the Waterway? Is grit blasting / water jetting proposed to take place over or near to the Will temporary works affect navigation? Will any dredging be needed? Is material to be dredged contaminated? Will the watertight lining of the canal be affected? Is puddle clay to be used? Is there to be any sheet steel piling in the canal? Is any driven piling for foundations etc. proposed near to the canal? Is vibro-compaction or dynamic compaction near to the canal proposed? Is there to be grouting of mine workings or other voids near to the canal? Is floating plant to be used? Are construction materials to be transported by water? When is it envisaged the works be carried out? Is a stoppage of canal traffic envisaged? Will it be necessary to have a temporary towing path diversion during the Works? Has consideration been given to access for disabled users? Are excavations proposed near to the waterway? Is procurement by Design and Build envisaged? Are services in the towing path affected? Do the Works affect a Site of Special Scientific Interest? Do the Works affect a Scheduled Ancient Monument? Do the Works affect Listed Buildings? Do the Works affect Conservation Areas? Do the Works affect Public Open Space? Do the Works affect Public Rights of Way? Are trees protected by Tree Preservation Orders affected? Are hedgerows affected? Is the channel affected? Are existing structures such as bridges / locks etc affected? Is dewatering / diversion of flow envisaged? Will a formal Environmental Impact Assessment be compiled for the works? How will access be gained to the Works for construction? Is Contaminated ground a design consideration? Are protected species such as bats or water voles affected? Are there other impacts not mentioned above?	
Signed:.....**Date:**..... **On behalf of:**.....	

APPENDIX 2 - OUTLINE POLLUTION RISK AND HYDROLOGICAL ASSESSMENT

The following information is required from the Promoter at an early stage in order to assess the viability or feasibility of the proposal.

Note that this checklist only applies to surface water discharges. Other types of discharge such as sewage effluent and trade effluent should be treated on a case by case basis, but are not usually accepted.

Project.....

Promoter.....

Pollution

Pollution hazards

Information on the pollution hazards within the areas to be drained:-

- Planning use class.....
- use of area to be drained to canal.....
- nature and quantities of chemicals, fuel/oil, wastes, liquid food products, and other potentially polluting substances that may be used on area drained.....
- details of any activities which will occur in the drainage area, which could contaminate surface water. .....
- whether the site requires or has authorisation from the Environment Agency under section 6 of the Environmental Protection Act 1990 (IPC authorisation), or hazardous substances consent from the local authority under the Planning (Hazardous Substances) Act 1990 .....
- any previous contaminate uses of the site, and if so, any soil contamination found from any site investigations.....
- if highway drainage is included, average annual traffic density, and whether industrial premises access directly to the road.....

Management controls

Any documentation relating to the environmental commitment and environmental track record of the Promoter, and of the person ultimately responsible for the drainage if different. It should be relevant both to design and construction and to the use operation and maintenance of the areas drained and of the drainage system with respect to prevention of water pollution, e.g. :-

- Company Environmental Policy
- Environmental Management System
- other relevant procedures or standards
- where the discharge is an existing one, details of any prosecutions, enforcement notices or cautions from any environmental regulator within the last 5 years relating to the discharge

Hydrological

- surface area drained (permeable)……ha
- surface area drained (impermeable)……ha
- diameter of final pipe run……mm
- gradient of final pipe run……
- physical constraints to limit flow (e.g. pump capacity, hydrobrake……
- Peak peak runoff to canal for a 1:100 year return period using "Wallingford Procedure" for urban drainage systems or based on physical constraints (e.g. pump capacity, hydrobrake)……l/s

APPENDIX 3 - CONTRACT PRINCIPLES

Contracts will normally:

- provide that the Promoter may be required to lift, shift or remove his Works where they subsequently interfere with the performance of our statutory obligations and business.
- not provide rights of support, or accept the imposition of additional loads on the Waterway Property; the structures were not designed for that purpose.
- require appropriate indemnities/insurance/ warranties to protect British Waterways from damage whether direct or consequential.
- require accommodation works, repair and decoration obligation to remedy any structural, safety, pollution, and environmental effects of the Promoters Works.
- provide for cost recovery payments and an appropriate charge to be made for the use of British Waterways' property.
- be for fixed terms or subject to determination by notice. It is the policy of British Waterways not to grant Contracts in perpetuity.
- not provide for a stoppage or closure of the navigation and towpath to assist the installation of the Works. Occasionally British Waterways will organise a closure on behalf of the Promoter but as users of the Waterway need to be properly accommodated a long lead time is usually required and the Promoter will incur additional costs.
- confirm that all-Professional advisers, Consultants and Contractors have all the necessary insurance, including Professional Indemnity Insurance, where applicable.
- make provision for future maintenance, repair, alteration and demolition.
- include drawings, details and specifications, along with such relevant information deemed necessary.
- Require the provision for acceptance by the Engineer of Contractor's Method & Safety Statements & Temporary Works proposals.
- require that, where there is a discharge, no noxious, poisonous, polluting or solid matter is caused or knowingly permitted to enter the waterway, or to comply with the requirements of any consent or other authorisation from the Environment Agency (SEPA in Scotland) where such exists.

It must be remembered that:

- the Engineer, on behalf of British Waterways, reserves the right to supplement or vary these technical conditions and requirements by the issue of specific requirements when assessing the implications of a specific proposal or later during the construction if he considers it necessary, particularly where technical developments take place in the intervening period.
- acceptance of any drawings or proposals only implies that the Works shown thereon meets the requirements of the Engineer; the Promoter should satisfy himself that the Works are adequate to him.
- the Works must be carried out in accordance with the programme, method statements, designs, plans and specifications submitted to and accepted by the Engineer; the Promoter shall remain fully responsible and liable to British Waterways for the adequacy of such designs, plans and specifications, and shall be responsible for ensuring that the Contractor abides by them.
- notwithstanding any observations or comment made by the Engineer or his representatives, the Promoter shall remain fully responsible and liable to British Waterways for the adequacy of all investigations, design plans, programmes, working practices and other activities associated with the Works.

APPENDIX 4 - TYPICAL COSTS UNDERTAKING

To be completed on Promoter's headed paper and sent to British Waterways as a temporary cost recovery contract, until a such time as a permanent agreement for the works has been negotiated

to British Waterways

address (see Appendix 8)

Dear Sirs

Scheme Title

COSTS UNDERTAKING

[*insert name of Promoter*] is proposing to construct [*describe works*] affecting the interests of British Waterways at [*location*]. The requirement to cover the costs of British Waterways is acknowledged as follows:

1. In consideration of your proceeding to negotiate and instructing your solicitors, engineers, surveyors or other appropriate professionals (whether external or in-house) to advise you and to subsequently proceed with the requisite work involved in the grant to us of a Contract in respect of [*scheme title*] affecting British Waterways we hereby agree and undertake to defray your costs and fees (including VAT and disbursements) in relation to the matter and to follow the requirements and conditions set out in Appendix 4 of the *Code of Practice for Works affecting British Waterways*.

2. This undertaking will apply whether or not the proposal proceeds to a legally binding Contract provided always that in the event that the Board unreasonably withdraws from the negotiations in respect of the Contract in circumstances where we are ready, able and willing to proceed forthwith to a legally binding Contract on terms that have been settled between us in writing then (and in those circumstances only) no liability for costs on the part of this company accrue.

3. This undertaking is given on the basis that fees in relation to this matter shall be charged at the rates set out in the Annex to this letter [but shall in no circumstances without further discussions with us exceed the sum of £[*insert agreed sum*] (plus Value Added Tax and disbursements).

4. If by [*insert agreed date*] no Contract has been completed (and accordingly no payment pursuant to this undertaking has been made) you will be entitled to deliver to us (and we agree and undertake to pay) a reasonable interim bill (and any further reasonable interim bills thereafter) on account of services rendered to the Board in connection with this matter. Such interim payment or payments shall not in any way affect or compromise the continuing liability of this company pursuant to the terms of this undertaking.

5. The sum of £250 is enclosed as a contribution to the administrative costs of British Waterways in making an initial assessment of our Application. We acknowledge that the payment of that sum to British Waterways does not place British Waterways under any further obligation to us in respect of the Application or in the execution of any Works that may arise in connection with the Application. We further acknowledge that the sum paid is non-returnable whether or not our Application proceeds and that the acceptance by British Waterways of that sum does not constitute any representation or warranty on British Waterways' part that it will accept the Promoter's Works.

Yours faithfully

……

[Director/Officer duly authorised to bind plc/company/organisation]

These rates are reviewed annually.

British Waterways' costs arising from the Works proposals pre, post and during works, will be invoiced upon the following scales. However, should consultancy, specialist or complex operational services be needed, such services will be charged at cost. British Waterways reserves the right to invoice upon a monthly basis where accrued costs exceed £500.

1. British Waterways staff costs:

Operational & Administrative	£40 / hour
Technical & Supervisory	£55 / hour
Professional & Management	£70 / hour
Senior Management	£100 / hour

2. **British Waterways' Disbursements:** Travelling, subsistence and other out-of-pocket expenses will be recharged at cost. Car mileage will be at 50p per mile.

3. **Consultants' Costs:** If it is reasonably necessary for British Waterways to retain consultant specialist advice, such services will be recharged to the Promoter at cost. The Promoter will be advised of such requirements by British Waterways in advance.

4. **Abortive costs:** British Waterways may, in some instances, incur costs in considering proposals which prove abortive. British Waterways' costs will still be invoiced as above.

5. **Navigation Notices:** For providing, issuing or amending a Restriction to Navigation or Stoppage Notice - £300 minimum.

6. **Stoppage Charge**: As below, unless otherwise defined in the Contract, correspondence, or separate Agreement

7. **Third Party Costs**: Any costs to third parties, be they customers of British Waterways or otherwise, which result from the Works.

8. **Loss of Water:** For each megalitre of water, or part thereof, which in the estimation of the Engineer has been run to waste as a result of the Works – A figure determined to suit local circumstances – e.g. water obtained by pumping is more expensive than that from reservoirs plus any loss of fishing revenue and cost of fish rescue and dewatering, if applicable.

9. **Works carried out by British Waterways:** If, as a prerequisite or consequence of the Promoter's Works, British Waterways agrees to undertake any additional accommodation works, the cost of such will be fully recoverable.

10. A charge equal to the reasonable cost of British Waterways of any labour, plant and material consumed in dewatering and refilling any section of Waterway to accommodate the Works.

11. The Promoter will be responsible for any necessary liaison with Highway Authorities in respect of footpath/bridleway closure or diversion and all charges related thereto, also any costs which British Waterways may incur in respect of towpath, land and property access modifications required by the Works.

12. **VAT:** All rates are exclusive of VAT, which will be added on invoices.

STOPPAGE CHARGES

Notes:

- see General Information and Requirements
- British Waterways will define in which category a particular waterway or location comes
- stoppages normally start on a Monday morning at 07.00 and end on Friday evening at 20.00 – a 5 day winter stoppage would be charged at the rate above
- a continuous stoppage of several weeks would incur a multiple of the appropriate 5 day rate plus the relevant daily rate for the included weekend days
- the weekly rate is only available from mid November to Mid March, excluding the Christmas / New Year period. During the remainder of the year the daily rate only is available.
- when stoppages over-run beyond the agreed period the rate is doubled (see Example C)
- unauthorised stoppages are charged at double the standard rate
- if a late stoppage booking is accepted by the Engineer after 31 April, but more than 8 weeks before start date, the charge is increased by 25%
- if a late stoppage / restriction booking is accepted by the Engineer less than 8 weeks before the stoppage start date the charge is increased by 50% (see example D)
- compensation for freight carriers and other businesses may also be required
- stoppages will not normally exceed four weeks in duration

Length of Stoppage	Up to 30 min delay	Up to 5 hrs between 07:00 and 20:00	Overnight from 20:00 to 07:00	24 hours Mon – Frid	24 hours Sat / Sun	per 5 day period (Monday to Friday)
Commercial Waterways						
Ship Canal *e.g.Caledonian Canal*	*no charge*	£4,500	£1,900	£13,000	£14,000	*not available*
Commercial (heavy use) *e.g. Aire & Calder Navigation*	*not available*	£2,000	£1,600	£6,000	£6,500	*not available*
Commercial (light use) *e.g. Gloucester & Sharpness Canal*	*no charge*	£500	£300	£1,250	£1,600	£5,000
Leisure Waterways						
Busy *e.g. Llangollen Canal*	*no charge*	£450	£300	£950	£1,250	£3,750
Medium Use *e.g. Monmouthshire & Brecon Canal*	*no charge*	£325	£200	£625	£1050	£2,500
Light Use *e.g. Bridgwater & Taunton Canal*	*no charge*	£160	£100	£300	£425	£1,250

To reflect traffic levels at different times of year a multiplier is applied. To represent the loss of availability for the period before and after a bank holiday, a fixed sum is added to the charge, except where the canal is not used at all for leisure purposes. These are defined below. This table is valid from Jan. 2003 to March 2005 but is reviewed annually:

from	to		Commercial navigations	Leisure waterways	Holiday period fixed charge
12 March 2005	18 March 2005		2.5	5	
19 March 2005	3 April 2005	(Easter period)	4	10	£20k
4 April 2005	29 April 2005		2.5	5	
30 April 2005	8 May 2005	(Bank holiday period)	3	8	£20k
9 May 2005	27 May 2005		2.5	6	
28 May 2005	5 June 2005	(Bank holiday period)	4	10	£25k
1 July 2005	30 June 2005		2.5	9	
1 July 2005	26 Aug. 2005		2.5	12	
27 Aug. 2005	4 Sept. 2005	(Bank holiday period)	4	15	£25k
5 Sept. 2005	30 Sept. 2005		2.5	8	
1 Oct. 2005	30 Oct. 2005		2	5	
31 Oct. 2005	16 Dec. 2005	(low season)	1	0.8	
17 Dec. 2005	8 Jan. 2006	(Christmas & New Year)	3	6	£20k
9 Jan. 2006	10 March 2006	(low season)	1	0.8	
11 March 2006	7 April 2006		2.5	5	
8 April 2006	23 April 2006	(Easter period)	4	10	£20k
24 April 2006	28 April 2006		2.5	5	
29 April 2006	7 May 2006	(Bank holiday period)	3	8	£20k
8 May 2006	26 May 2006		2.5	6	
27 May 2006	4 June 2004	(Bank holiday period)	4	10	£25k
5 June 2004	30 June 2006		2.5	9	
1 July 2006	25 Aug. 2006		2.5	12	
26 Aug. 2006	3 Sept. 2006	(Bank holiday period)	4	15	£25k
4 Sept. 2006	30 Sept. 2006		2.5	8	
1 Oct. 2006	5 Nov. 2006		2	5	
6 Nov. 2006	22 Dec. 2006	(low season)	1	0.8	
23 Dec. 2006	7 Jan 2007	(Christmas & New Year)	3	6	£20k

Stoppage Charge Examples

Example A
August Bank Holiday (Friday to Monday) on Trent (Light use Commercial)
Basic rate for Friday & Monday £1,250
Basic rate for Saturday, Sunday £1,600
Multiply by 4 (August multiplier)
Add £25,000 (bank holiday fixed charge)
£[(2 x 1,250) + (2 x1,600)]4 + 25,000 = £47,800

Example B
Two weeks (Monday to Friday) in February on Llangollen Canal (busy leisure)
Basic rate for Monday to Friday £3,750 per day
Basic rate for Saturday & Sunday £1,250
Multiply by 0.8 (February multiplier)
£ (3,750 x 2 + 1,250 x 2) 0.8 = £8,000

Example C
Two weeks (Monday to Friday) in February on Llangollen Canal (busy leisure), with over-run of 7 days)
Basic rate for Monday to Friday £3,750
Basic rate for Saturday & Sunday £1,250
Multiply by 0.8 (February multiplier)
£ (3,750 x 2 + 1,250 x 2) 0.8 = £8,000
add [£3,750 + 2 x £1,250] x 2 (over-run) x 0.8 (time of year) for the over-run = £10,000
£8,000 + £10,000 = £18,000

Example D
Two weeks (Monday to Friday) in February on Llangollen Canal (busy leisure) booked less than 8 weeks before the start date
Basic rate for Monday to Friday £3,750
Basic rate for Saturday & Sunday £1,250
Multiply by 0.8 (February multiplier)
£ (3,750 x 2 + 1,250 x 2) 0.8 = £8,000
Multiply by 1.50 (late booking)
£12,000

Example E
Three weeks (Monday to Friday) in February on Llangollen Canal (busy leisure)
Basic rate for Monday to Friday £3,750
Basic rate for Saturday & Sunday £1,250
Multiply by 0.8 (Low season multiplier)
£ (3,750 x 3 + 1,250 x 4) 0.8 = £13,000

Example F
Ten weeks (Monday to Friday) on Monmouthshire & Brecon Canal (medium use leisure) from Monday January 6th 2003
10 weeks (Monday to Friday)
18 weekend days
Basic rate for Monday to Friday £2,500
Basic rate for Saturday & Sunday £1,050
Low season multiplier 0.8
£ (10 x 2,500 + 18 x 1050) 0.8 = £35,120
Total charge £35,120

Example G
Overnight in June on Selby Canal (medium use leisure)
Basic rate for overnight £200
Multiply by 9 (June multiplier)
Charge £1,800

Example H
Up to 5 hours on a May Tuesday on Aire & Calder Navigation (busy commercial)
Basic rate for up to 5 hours, day time £2,000 (= busy commercial)
Multiply by 2.5
Charge £5,000

Example I
Ten weeks (Monday to Friday) on Monmouthshire & Brecon Canal (medium use leisure) from Monday November 4th 2002 to Friday 24th Jan 2003, including Christmas
7 weeks (Monday to Friday) before Christmas
12 weekend days before Christmas
Christmas / New Year - 6 weekend days and 10 weekdays (including Bank Holidays)
2 weeks (Monday to Friday) after Christmas
4 weekend days after Christmas
Basic rate for Monday to Friday £2,500
Basic rate for Saturday & Sunday £1,050

Basic daily rate £625
Low season multiplier 0.8
Christmas / New Year multiplier 6
Add £20,000 (bank holiday fixed charge)
before Christmas £ (7 x 2,500 + 12 x 1050) 0.8 = £24,080
Christmas / New Year £(10 x 1,050 + 6 x 625) x 6 + 20,000 = £105,500
after Christmas £ (2 x 2,500 + 4 x 1,050) 0.8 = £7,360
Total charge £136,940

APPENDIX 5 - 'SPECIAL REQUIREMENTS IN RELATION TO THE BRITISH WATERWAYS BOARD'

INTRODUCTION

The following should be inserted into Works Contracts with additional agreed clauses being added as required.

In these Special Requirements, the definitions vary from those in the rest of this Code to reflect the different contractual position :-

- 'Employer is used rather than 'Promoter'
- 'Board's Representative' is used rather than 'Engineer'
- 'The Board' is used rather than 'British Waterways'

This section includes the contract clauses agreed with the Highways Agency (Guidance Note 28 MCD Special Requirements in relation to the British Waterways Board).

SPECIAL REQUIREMENTS IN RELATION TO THE BRITISH WATERWAYS BOARD

1. In these Special Requirements the following terms shall have the meanings assigned to them:-

   a) 'The Board' means the British Waterways Board.

   b) 'Board's Representative' means the Engineering Manager of the British Waterways Board or other duly Authorised Representative and/or Agent appointed for the time being to act on his behalf by the Board.

   c) 'Waterway' means any canal towpath river culvert feeder reservoir watercourse or channel and/or property or premises of any kind administered owned leased or rented by 'The Board' in pursuit of or as part of its Statutory functions or its business.

   d) 'The Board's By-Laws' means the General Canal Bye-Laws dated 1965 and subsequent amendments.

2. The Contractor shall particularly note that the Board is established by Act of Parliament and that its responsibilities for the Board's Waterway Property and Premises are the subject of Statutory Law and The Board's Bye-Laws with which the Contractor should familiarise himself.

3. The Contractor shall provide to the Board's Representative:-

   a) at least 14 days written notice before commencing any work or moving heavy plant or equipment over any portion of the Site on in or affecting the Board's Waterway Property or premises.

   b) at least 14 days written notice of all new temporary works including preparatory work for permanent works

   c) at least 14 days written notice of all pile-line setting out

   d) at least 14 days written notice all puddling processes.

   e) an outline programme for the Works

f) a Method Statement for all Works or operations which may affect the Waterway

g) a Safety Plan that addresses the hazards and risks to users of the Waterway, the Board's employees, the environment under the control of The Board, the property of the Board and the property of legitimate visitors to the Board's facilities

h) details of any Temporary Works affecting the Waterway.

i) subject to the Employers agreement copies of Environmental Impact Assessments (if any) as may be required by the Employer under the Contract.

j) the completed work before the Contractor moves off site

4. The Contractor shall present and maintain to the satisfaction of the Board's Representative an up to date General Arrangement drawing of adequate scale and details showing the Permanent and Temporary Works as they affect the Waterway towing path property and/or premises of the Board.

5. The Contractor shall provide to the Board's Representative **NOT LESS** than 7 days written notice of any change to the programme, the Method Statement/Safety Plan or details which affect the Waterway. The Board's Representative can be contacted at the following point:-

Address:-	(project specific)
Telephone:-	(project specific)
Out of hours telephone:-	0800 4799947
Fax:-	(project specific)

6. The Contractor will be required to obtain the agreement of the Board's Representative for setting out of major elements of the Works on or affecting the Board's Waterway property or premises.

7 All operations affecting The Board's Waterway property or premises shall be carried out in such a manner so as not to endanger or damage The Board's property and/or any persons entitled to be present thereon and to avoid (except to the extent agreed in writing) any interference to the free movement of any persons, pedestrians and/or road and waterborne traffic.

8. The Contractor shall not commence any Works, particularly excavation piling or dredging work, until adequate provisions to the satisfaction of the Board's Representative have been taken to ensure the stability and security of any Waterway or associated supporting structures whether in the ownership of The Board or not and to prevent the escape of water therefrom.

9. The Contractor shall if required by the Board's Representative provide temporary fencing to the satisfaction of the Board's Representative to provide safety and to prevent trespass or the straying of animal or poultry stock.

10. The Board's Representative shall at all times have reasonable access to The Board's Waterways property or premises on the site.

11. Unless otherwise agreed uninterrupted passage for craft on the Waterway is to be maintained at all times. All lights provided by the Contractor shall be so placed or screened so as not to interfere with any signal lights, navigation lights and/or beacons of the Board. Any Temporary Works which obscure signs signals or beacons shall not be erected without the written permission of the Board's Representative .

12. In addition to any special marking or lighting requirements of the Board's Representative, warning notices/signs/lights must be displayed throughout the duration of the Works as follows:

- boards with the words "CAUTION - WORKS IN PROGRESS" in red letters 150 mm high on a white background shall be erected on both banks of the navigation at a distance of 100 and 200 metres upstream and downstream of the Works.
- where appropriate, metal squares 450 mm by 450 mm of cruciform construction painted red shall be displayed to define the navigation opening upstream and downstream of the Works and also at the extremities of the lead into the navigation opening both upstream and downstream of the Works.
- by night, lights shall be displayed to define the navigation opening upstream and downstream of the Works. Two red lights side by side, 300 mm apart should be fixed at each position and in addition an amber light should be displayed upstream and downstream of the Works to mark the centre of the navigation opening.

It should be noted that the requirements for signing and lighting may vary from Waterway to Waterway, but the above is to be regarded as a minimum requirement unless otherwise directed. The Promoter should check with the Board whether the navigation is affected by the navigation marker requirements of IALA, Trinity House and the Northern Lighthouse Board.

Where the completion of the Works in accordance with the Contract on or near the edge of the Waterway involves projections of any kind into the navigable channel and/or anywhere vertically above the line of its edge the Contractor shall conform to the Board's Bye-Laws in respect of signing, marking, lighting and fendering.

14 All lights provided by the Contractor shall be so placed or screened so as not to interfere with any signal lights, navigation lights and/or beacons of The Board. Any Temporary Works which may interfere with the sighting of such equipment shall not be erected without the written permission of the Board's Representative.

15 No construction equipment for the Works shall be allowed on the Board's property and, in particular, adjacent to the canal without the acceptance of the Board's Representative which may be subject to the prior submission of stability calculations.

16 The Contractor shall NOT without the specific written permission of the Board's Representative (and then ONLY under such conditions and restrictions as the Board's Representative may require) do any of the following:-

a) Use or place plant and/or heavy vehicles which may cause damage to the Waterway and which shall particularly include but not be limited to damage to Waterway walls.

b) 'Crane' or otherwise similarly move plant materials and/or vehicles over any Waterway.

c) Use floating plant barges and/or pontoons and the like in any Waterway.

d) Excavate, tunnel or carry such other underground operations beneath any Waterway.

e) Display any advertisement or other material, except as specifically required by this Special Requirement, on or above The Board's Waterway property or premises.

f) Discharge trade or sewage effluent, or arisings, surface water of any kind in any way into or onto The Board's Waterway property or premises.

g) Abstract extract and/or draw water from The Board's Waterway property or premises.

h) Damage or remove flora, fauna, waterway relics, architectural heritage, industrial heritage, landscaping, towing paths or waterway walls.

i) Store fuel or oil re-fuel service vehicles or plant on or in proximity to the Waterway where there is a risk of pollutants entering the Waterway.

j) Access the Board's property or premises by any unauthorised route.

17 The Contractor shall take all necessary measures to prevent:-

a) Siltation of any Waterways.

b) Damage to the Board's property and premises.

c) Construction debris, materials or arisings of any sort which shall include but not be limited to bricks, timber, containers of any kind, reinforcing bars, polythene or plastic sheeting entering any Waterway.

d) Contamination of the Waterway with any toxic, or other polluting matter or liquid of any sort which shall include but not be limited to grout, concrete, or silane.

e) The creation of any hazard to the visitors to the Waterway which shall include but not be limited to oxy-acetylene burning, welding, grit blasting, water jetting or cleansing, spraying or pointing. Alternatively all such Works shall cease until the craft or persons are past and clear.

f) The spread of any prohibited species which shall include but not be limited to Japanese Knotweed or Giant Hogweed.

In the event of any of the above occurring the Contractor shall immediately inform the Board's Representative and the Engineer and shall immediately carry out the instructions of the latter to abate and remedy the situation.

18 On completion of the Works all surplus material attributable to the Works, including any temporary works, on the Board's property shall be removed from it and the property shall be made good to the satisfaction of the Board's Representative .

19 Prior to Works being carried out the cross section of the canal will be determined by the Contractor by dipping. During the carrying out of the Works all debris and material resulting from or used in connection with the Works, which may cause damage or danger to the Board's property and/or Waterway or those using it, must be removed immediately and to the satisfaction of the Board's Representative. After Works are complete the canal must be dipped again to ensure that no debris remains

20 Where for the purpose of completing the Works in accordance with the Contract any Temporary Works are required above the Waterway the Contractor shall, except where otherwise specified in the Contract or agreed in writing by the Board's Representative, provide and maintain a minimum height clearance of not less than (..project specific...m) above the water surface of the Waterway or highest expected water surface where this is variable.

The Contractor should particularly note when planning any work in relation to the Waterway that the Board cannot guarantee any particular water level or depth not prevent any fluctuations to such water level depth or speed of flow in any Waterway.

21 If completion of the Works in accordance with the Contract necessitates the closure and/or the reduction in width of the Waterway or towpath the Contractor shall strictly comply and work within the arrangements and limits which shall have been the subject of an Agreement between the Employer and The Board for the closure and/or reduction in width of the Waterway or towpath.

22 Where the completion of the Works in accordance with the Contract on or near the edge of the Waterway involves projections of any kind into the navigable channel and/or anywhere vertically above the line of its edge the Contractor shall conform to the Board's Bylaws in respect of signing, marking, lighting and fendering.

23 Any vessel or craft on the Waterway for which the Contractor has obtained the permission of the Board's Representative shall be licensed used and moored in accordance with the Board's Bye-Laws.

24 If any plant, vessel or craft falls or sinks or is cast adrift the Contractor shall immediately inform the Board's Representative and the Engineer and take immediate steps to make the hazard known to users of the Waterway. The Contractor shall immediately arrange the salvage/re-securing of the plant, vessel or craft from the Waterway and until such salvage/re-securing has been completed the Contractor shall provide buoys and/or markers and erect warning notices indicating the navigation hazard to Waterway users to the satisfaction of the Board's Representative.

25 The Contractor shall keep the Board's Waterways property or premises free from rubbish. The Contractor shall not leave rubbish on or in Waterways property or premises and shall subject to the approval of the Engineer clear away and remove all constructional plant surplus materials and Temporary Works from Waterways property or premises as and when these cease to be required for the purposes of the Works. All damage to The Board's property shall be made good by the Contractor to the satisfaction of the Board's Representative.

EMERGENCY ACTION

26 The following actions shall be taken by the Contractor in the event of any damage in the Waterway its containment and/or supporting structure or banking:-

a) IMMEDIATELY inform The Board the Engineer and (if required) the Emergency services.

b) Secure the area from the approach of traffic and/or the general public.

c) Render every assistance to the Emergency Services and/or The Board as shall be requested for the purposes of mitigating water loss and/or damage arising from the incident and/or for the purpose of securing public safety and the stability of other property.

27 Compliance with the above requirements shall not relieve the Contractor or any of his obligations under the Contract.

APPENDIX 6 - REVISIONS TO THE CODE

October 2005	review with reference to sustainability
	review of site investigation and diving sections
	review of waste disposal references
	reference to licensing of fish rescue
	an extra section on the statutory framework
	clarification of the procedures for river navigations
	changes to cost recovery arrangements
	a revisions section
July 2004	a section on hydro-electric power added
	house style changed
March 2002	review of charges
	available in pdf format for Email use and inclusion on the website
	clarification on the design & construction stage submissions with regard to method & safety statements
	extra sections on bank protection, linings and fendering
	clarification on the requirements on stoppages and towing path closures
	review on matters heritage and environmental.
January 2000	review with regard to matters environmental
	additional section on diving
April 1998	commercial matters moved to the appendices.
	procedural section added.
	section on maintenance added
	the Special Requirements agreed with the Highways Agency added

APPENDIX 7 – REFERENCES FOR SUSTAINABLE PROJECTS

The following industry references provide further detail for the delivery of a more sustainable project, and should be used where appropriate:

SUBJECT	REFERENCES
Sustainable Urban Drainage Systems (SUDS).	• CIRIA Publication C523 *Sustainable Urban Drainage Systems – Best Practice Manual*. • *Sustainable Urban Drainage Systems – An Introduction.* A 20 page booklet produced by EA, SEPA and Environment and Heritage Service. • CIRIA Publication C522 *SUDS Design Manual for England and Wales.* • CIRIA Publication C521 *SUDS Design Manual for Scotland and Northern Ireland.*
Green Procurement (e.g. timber & recycled aggregates).	• Waste Reduction Action Programme (WRAP) – www.wrap.org.uk • AggRegain (the sustainable aggregates information service from WRAP including specification of use, supplier information & case studies) – www.aggregain.org.uk • Tarmac (leading UK supplier of building materials) – www.tarmac.co.uk. • WWF – UK Forest and Trade Network – www.wwf.org.uk/95+group (formally WWF 95+ Group). • Building Research Establishment (BRE) – www.bre.co.uk. • Timber Research and Development Association (TRADA) - www.trada.co.uk
Pollution Prevention	• Environment Agency (undated), Pollution Prevention Guidelines – Works in, near or liable to affect watercourses: PPG5 – available from http://www.environment-agency.gov.uk/commondata/acrobat/ppg05.pdf • Environment Agency (undated), Pollution Prevention Guidelines – Working at Construction & Demolition Sites: PPG6 – available from http://www.environment-agency.gov.uk/commondata/acrobat/ppg06_25.03.03.pdf • CIRIA Publication C532 *Control of pollution from construction sites*
Water Use	• Environment Agency, Savewater - http://www.environment-agency.gov.uk/subjects/waterres/286587/?version=1&lang=_e

APPENDIX 8 - BRITISH WATERWAYS ADDRESSES

SCOTLAND

British Waterways Canal House Applecross Street Glasgow G4 9SP Tel: 0141 332 6936	Caledonian Canal, Forth & Clyde Canal, Union Canal, Monkland Canal

NORTH WEST WATERWAY

British Waterways Trafalgar House, Temple Court, Birchwood, Warrington WA3 6GD Tel: 01925 847700	Ashton Canal, Huddersfield Narrow Canal west of Standedge Tunnel, Lancaster Canal, Leeds & Liverpool west of Bridge 158 (Greenberfield) including Rufford and Leigh branches, Manchester Bolton & Bury Canal, Peak Forest Canal,Rochdale Canal, Sankey (St Helens) Canal

YORKSHIRE WATERWAY

British Waterways Fearns Wharf, Neptune Street, Leeds LS9 8PB Tel: 0113 281 6800	Aire & Calder Navigation, Calder & Hebble Navigation, Huddersfield Broad Canal, Huddersfield Narrow Canal east of and including Standedge Tunnel, Leeds & Liverpool Canal east of Bridge 158 (Greenberfield),Pocklington Canal, River Ouse, River Ure and Ripon Canal, River Tees, Selby Canal and River Aire, Sheffield & Tinsley Canal, Sheffield & South Yorkshire Navigation, including Stainforth & Keadby Canal, New Junction Canal, Standedge Visitor Centre

WALES & BORDER COUNTIES WATERWAY

British Waterways Navigation Road, Northwich, Cheshire CW8 1BH Tel: 01606 723800	Caldon Canal including Leek Branch, Llangollen Canal, Macclesfield Canal (from Church Lane bridge 2), Monmouthshire & Brecon Canal, Montgomery Canal, River Weaver, Shropshire Union north of Bridge 74 (Audlem) including Middlewich Branch, Swansea Canal, Trent & Mersey Canal north of Bridge 104 (Trentham)

EAST MIDLANDS WATERWAY

British Waterways The Kiln, Mather Road, Newark, Nottinghamshire NG24 1FB Tel: 01636 704481	Chesterfield Canal, Erewash Canal, Fossdyke & Witham Navigations, Grand Union Leicester Line north of Kings Lock (Aylestone) including River Soar, Grantham Canal, River Trent, Nottingham & Beeston Canal, Cromford Canal

WEST MIDLANDS WATERWAY

British Waterways Albert House, Quay Place, 92-93 Edward Street, Birmingham B1 2RA Tel: 0121 200 7400	Birmingham Canal Navigations, including Stourbridge and Dudley canals, Shropshire Union Canal south of Bridge 74 (Audlem), Staffs & Worcs Canal north of Stourton Junction, Trent & Mersey between Bridge 104 (Trentham) and Colwich Lock

CENTRAL SHIRES WATERWAY

British Waterways
Peel's Wharf,
Lichfield Street,
Fazeley,
Tamworth B78 3QZ
Tel: 01827 252000

Ashby Canal, Birmingham & Fazeley Canal north of Broad Bulk Bridge (Minworth), Coventry Canal, Grand Union Canal between Bridge 85 (Solihull) and Norton Junction, Oxford Canal north of Bridge 9 (Ansty), Staffs & Worcs Canal south of Stourton Junction, Stratford Canal, Trent & Mersey Canal between Derwent Mouth Lock and Colwich Lock, Worcester & Birmingham Canal south of Kings Norton Junction

SOUTH EAST WATERWAY

British Waterways
Ground Floor
Witan Gate House
500-600 Witan Gate
Central Milton Keynes
MK9 1BW
Tel: 01908 302500

Grand Union Canal between Napton Jn and Bridge 175 (Rickmansworth), GU Aylesbury arm, GU Northampton arm, GU Wendover arm, Grand Union Leicester Line south of Kings Lock (Aylestone), Oxford Canal south of Bridge 9

SOUTH WEST WATERWAY

British Waterways
Harbour House,
West Quay,
The Docks,
Gloucester GL1 2LG
Tel: 01452 318000

Bridgwater & Taunton Canal, Gloucester & Sharpness Canal, Kennet & Avon Canal, River Severn

LONDON

British Waterways,
1 Sheldon Square,
Paddington Central,
London W2 6TT
Tel: 020 7985 7200

Grand Union Canal south of Bridge 175 (Rickmansworth),Regents Canal, Paddington Arm, River Lee, River Stort, Bow Back Waters, West India Docks

OTHER USEFUL ADDRESSES

BWML (British Waterways Marinas Ltd.)
Sawley Marina,
Sawley,
Nottinghamshire
NG10 3AE Tel: 0115 973 4278

NB Waterway boundaries and office addresses and telephone numbers may change from time to time; check on www.britishwaterways.co.uk

Easynet (formerly IPSARIS, formerly Fibreway Ltd.) (Optic fibre cables in towing path)
Easynet Telecommunications,
70 Buckingham Avenue,
Slough
SL1 4PN
Easynet Service Management Centre available 24 hours for emergency calls
Tel: 08000 273242.

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